

ROYAL BOTANIC GARDENS, KEW.

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MISCELLANEOUS INFORMATION.

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VI.—CONTRIBUTIONS TO THE FLORA OF SIAM.

ADDITAMENTA III.

*Mitrephora trimera*, Craib [Anonaceae-Mitrephoreae]; *M. Prainii*, King, facie similis sed foliorum nervis paucioribus, foliis fasciculatis haud solitariis 3-meris haud 4-meris distincta.

*Arbuscula* (ex Kerr), ramulis fuscis primo puberulis mox glabris vel fere glabris pauci-lenticellatis. *Folia* oblongo-oblanceolata, apice breviter obtuse acuminata, basi parum inaequalia, late cuneata vel cuneato-rotundata, 13–23.3 cm. longa, 4–9 cm. lata, chartacea, supra costa primo densius mox tenuiter strigillosa, subtus costa nervisque primo parcius adpresse strigillosa, mox fere glabra, nervis lateralibus utrinque 10–12 plerumque 11 supra conspicuis subtus prominentibus, nervis transversis supra subconspicuis subtus prominulis, petiolo validiusculo supra canaliculato ad 9 mm. longo fusco pubescente suffulta. *Flores* ♂ in fasciculos saltem 10-floros axillares vel ex axillis foliorum delapsorum ortos dispositi; pedicelli 1.3–1.7 cm. longi, medio vel paulo supra medium minute bracteolati, adpresse pubescentes. *Sepala* 3, transverse oblonga, rotundata, 1 mm. longa, 1.5 mm. lata, dorso breviter pubescentia. *Petala* exteriora 3, sepalis duplo longiora, dorso breviter pubescentia; interiora 3; unguis circiter 3 mm. longus; pars expansa late triangularis, circiter 4 mm. longa, 5.5 mm. lata, dorso breviter pubescens, intra glabra. *Stamina* numerosa. *Pistilla* deficientia.

Nan, Hui Sui, in evergreen jungle, 240 m., Kerr, 2421.

*Alphonsea glabrifolia*, Craib [Anonaceae-Miliuseae]; ab affini *A. Boniana*, Finet et Gagnep., foliis majoribus glabris, ovulis circiter 16 recedit.

*Arbor* circiter 9 m. alta (ex Kerr); ramuli primo tenuiter breviter adpresse ferrugineo-pubescentes, mox glabri vel subglabri, fusco-corticati, inconspicue pauci-lenticellati. *Folia* lanceolata vel oblongo-lanceolata, apice acuminata, obtusa, plerumque mucronulata, basi parum inaequalia, cuneata, vel late cuneata, 4.7–12 cm. longa, 1.5–3.8 cm. lata, chartacea, glabra, nervis lateralibus

utrinque 9-11 intra marginem anastomosantibus supra conspicuis vel subprominulis subtus cum nervis transversis prominulis, petiolo circiter 3 mm. longo supra canaliculato indumento ut ramulis suffulta. *Pedunculi* plerumque oppositifolii, 3-4 mm. longi, abortu uniflori, indumento ut ramuli; pedicelli pedunculo aequales vel eo paulo longiores, parvi-bracteolati, floribus albis (ex Kerr). *Sepala* 3, arcute recurvata, transverse oblonga, 1.75 mm. longa, 2.5 mm. lata, ciliolata. *Petala* exteriora apice obtusa, basi saccata, 13 mm. longa, 5.5 mm. lata, extra minute adpresse ferrugineo-pubescentia, intra superne praecipue puberula; interiora apice obtusa, demum recurvata, inferne contracta, saccata, 12.5 mm. longa, 5 mm. lata, extra minute adpresse ferrugineo-pubescentia, intra glabra. *Receptaculum* convexum, setosum. *Stamina* circiter 4-seriata; filamenta brevina, validiuscula; antherae 1 mm. longae, breviter obtuse apiculatae. *Ovarium* cum stylo perbrevis 3 mm. altum, subsericeum, ovulis circiter 16 2-seriatis.

Near Rawng Kwang, Mè K'Mi, in evergreen jungle, 210 m., Kerr, 2370 (type of the species); Hui Ché, 300 m., Luang Vanpruk, 316.

*Polygala caterviflora*, Craib [Polygalaceae]; ab affini *P. floribunda*, Dunn, fructuum alis altius emarginatis fissurae lateribus parallelis facile distinguenda.

*Ramuli* graciles, primo tenuiter pilosuli, mox glabri, angulati, pallide corticati. *Folia* oblanceolata vel late oblanceolata, parum inaequilatera, apice acute acuminata, basi in petiolum attenuata, 4-12 cm. longa, 1.2-3.8 cm. lata, tenuiter chartacea, supra fusca, subtus pallidiora, glabra, integra, nervis lateralibus utrinque 4-8 cum costa supra conspicuis subtus prominulis, nervulis supra subconspicuis; petioli 1-2 cm. longi. *Racemi* axillares, oppositifolii et terminales, densiflori, ad 10 cm. longi, breviter pedunculati; pedicelli sub anthesin 3 mm. longi, infructescentes 4 mm. longi, glabri; bractae deciduae, 3.5 mm. longae. *Sepala* 3 exteriora plus minusve cucullata, circiter 3.5 mm. longa, glabra, 2 interiora petaloidea, oblongo-oblanceolata, 2.6 cm. longa, 6 mm. lata. *Petala*, cum carinae crista fimbriata, 2 cm. longa, duobus posticis cum aliis ad 15 mm. connatis lobis oblongis apice rotundatis vix 5 mm. longis. *Ovarium* 1.5 mm. altum, stylo tenui 18 mm. longo. *Fructus* rotundatus, ad 9 mm. (ala 2 mm. lata inclusa) diametro.

Doi Intanon, Pah Ngeam, West side of North Peak, 2035 m., Garrett, 88.

*Hypericum Garrettii*, Craib [Hypericaceae-Hypericeae]; ab affini *H. Hookeriano*, Wight et Arn., foliorum nervis numerosioribus, floribus haud congestis recedit.

*Suffrutex* glaber; ramuli primo compressiusculi, mox teretes, cortice brunneo obtecti. *Folia* lanceolata vel oblongo-lanceolata, apice acuta, basi cuneata vel late cuneata, 1.7-4.2 cm. longa, 0.7-2 cm. lata, chartacea, pellucido-punctata, punctis saepe elongatis, nervis lateralibus utrinque 6-8 intra marginem anastomosantibus, distincte sed perbrevis petiolata. *Flores* et solitarii, ramulos laterales 6-10 cm. longos terminantes et terminales, racemosim dispositi, pedicellis 5-7 mm. longis suffulti. *Sepala* elliptica, oblongo-elliptica vel obovato, apice rotundata, ad 9 mm. longa et



6 mm. lata, sub fructu praecipue distincte costata. *Petala* obovata, ad 2.2 cm. longa et 1.8 cm. lata, inferne contracta. *Stamina* in fasciculos 5 petalis oppositos connata; filamenta 4.8 mm. longa; antherae parvae. *Ovarium* 8 mm. altum, 5 mm. diametro; styli 5, 7 mm. longi. *Fructus* 1.6 cm. altus, stylis persistentibus; semina minuta.

Doi Intanon, among rocks on steep hillside, 2142-2165 m., Garrett, 67.

*Pterospermum grandiflorum*, Craib [Sterculiaceae - Helicteraeae]; *P. truncatolobato*, Gagnep., facie persimile sed floribus haud semper solitariis partibus omnibus majoribus, staminodiis superne haud glabris, filamentis antheris fere quadruplo longioribus recedit.

*Arbor*, ramulis primo albo-tomentellis et parce brunneo-stellato-pubescentibus mox albido-tomentellis cortice cinereo-brunneo reticulato-striato obtectis. *Folia* 6.5-18 cm. longa, e basi truncata vel retuso-truncata parum inaequali 3.5 cm. lata lateribus ad apicem truncato-lobatum 4-11 cm. latum subaequaliter divergentibus, matura rigide chartacea, basi 3-nervata (vel 7-nervata, nervis inferioribus vix conspicuis), nervis secundariis (e costa ortis) utrinque 6-8 supra leviter impressis subtus valde prominentibus, nervis transversis supra conspicuis subtus prominentibus, pagina superiore glabra, inferiore minute albido-tomentella; petioli ad 1.5 cm. longi, indumento ut ramuli; stipulae deciduae. *Flores* axillares, plerumque bini vel terni, pedunculo communi valido ad 5 mm. longo suffulti; pedicelli pedunculo subaequilongi. *Sepala* linearia, subacuta, ad 7 cm. longa, 5 mm. lata, extra tomentella, intra adpresse hirsuta. *Petala* alba (ex Kerr), linearia, basi apiceque attenuata, curvata, litteram S plus minusve simulantia, circiter 5 cm. longa, 5 mm. lata, glabra. *Androphorum* ad 1.2 cm. longum, 1.25 mm. diametro, glabrum. *Stamina* 15, in greges 5 cum staminodiis circiter 4 cm. longis superne tuberculatis parcissime pubescentibus alternantes disposita; filamenta 2.5 cm. longa, glabra; antherae obtuse apiculatae, 7 mm. longae, glabrae. *Ovarium* sessile, vix 5 mm. altum, dense albo-stellato-hirsutum; stylus validus, staminodiis aequaltus, inferne stellato-hirsutus. *Fructus* valvae apice acuminatae, acutae vel subacutae, basi in stipitem validum circiter 2 cm. longum contractae, faciebus planae vel parum concavae, 8 cm. longae.

Chiengmai, Doi Sootep, in evergreen jungle, 660 m., Kerr, 1805.

*Clausena Kerrii*, Craib [Rutaceae-Aurantieae]; a *C. leni*, Drake, petiolulis 2.5 mm. longis, ovario omnino glabro recedit.

*Fruticulus* ad 3 m. altus (ex Kerr); ramuli molliter breviter albo-pubescentes, ad 5 mm. diametro, fusco-corticati. *Folia* alterna, ad 14-foliolata, 50 cm. longa, petiolo ad 6.5 cm. longo terete indumento ut rachi ramulisque suffulta; foliola alterna, inaequilatera, infima fere rotundata, suprema latere altero dimidio ovato-lanceolata, altero dimidio oblanceolata, apice acuminata, acuta, basi latere uno cuneata, altero attenuata, infima 4.6 cm. longa, 3.2 cm. lata, superiora ad 14 cm. longa et 6 cm. lata, pagina superiore costa nervisque praecipue breviter sparse pubescentia, inferiore molliter breviter albo-pubescentia, margine distanter serrulata, petiolulis brevibus suffulta. *Panícula* terminalis, racheos ramulorum pedicellorumque

brevium indumento ut ramulis; bracteae circiter 1.5 mm. longae; alabastra ovoidea, obtusa, conspicue glandulosa. *Sepala* crassa, ad 1 mm. longa, dorso parce pubescentia. *Petala* alba (ex *Kerr*), oblongo-ovata, 5 mm. longa, 2.75 mm. lata. *Filamenta* 0.75 mm. longa, antheris 3 mm. longis. *Ovarium* 1.25 mm. altum; stylus 2.5 mm. longus, pilis perpaucis hic illic instructus.

Near Wieng Papao, Ban Ta Kaw, in evergreen jungle, 510 m., *Kerr*, 2514.

*Aglaia meliosmoides*, *Craib* [Meliaceae - Trichilieae]; ab affini *A. submonophylla*, Miq., inflorescentia petiolo multo longiore recedit.

*Frutex* circiter 3 m. altus (ex *Kerr*); ramuli primo brunneofurfuracei, conspicue lenticellati, mox cinereo-corticati, lenticellis vix conspicuis. *Folia* alterna, simplicia, oblanceolata, apice acuminate, obtusa, basi obtusa, 10-17 cm. longa, 3-5 cm. lata, integra, chartacea, matura utrinque glabra, nervis lateralibus utrinque 13-17 supra conspicuis vel subconspicuis subtus cum costa prominentibus, costa supra impressa, nervulis supra subconspicuis vel obscuris subtus prominulis, petiolo 2-3 cm. longo apice valde incrassato supra parte incrassata canaliculata suffulta. *Panicula* axillaris, plerumque circiter 8 cm. longa; rachis ramulique conspicue rufo-stellato-pubescentes; bracteae angustae, ad 3 mm. longae, dense rufo-pubescentes; pedicelli ad 2 mm. longi, fere glabri. *Sepala* ad 1 mm. longa, ciliata, dorso superne pilis paucis rufis ornata. *Petala* lutea (ex *Kerr*), paulo ultra 1.75 mm. longa, 1.5 mm. lata. *Tubus* staminalis circiter 1.5 mm. longus, antheris vix exsertis. *Pistillum* 1 mm. altum; ovarium adpresse albo-pubescent, stylo ovario brevior glabro.

Near Rawng Kwang, Me K'Mi, in evergreen jungle, 210 m., *Kerr*, 2369.

*Allomorpha setosa*, *Craib* [Melastomaceae-Oxysporeae]; ob caules, petiolos foliorumque nervos pagina inferiore setis divergentibus instructos distincta.

*Suffrutex* ad 3 m. altus (ex *Kerr*); ramuli teretes, ad 3 mm. diametro, setis divergentibus circiter 2.5 mm. longis instructi. *Folia* ovato-lanceolata, apice indistincte acuminata vel attenuata, acutiuscula, basi rotundata, plerumque emarginata, 8.5-14 cm. longa, 3.5-6.8 cm. lata, chartacea, supra glabra vel setis hic illic parcissime instructa, subtus nervis nervisque setis divergentibus rigidiusculis instructa, e basi 5-nervia, nervis supra conspicuis subtus prominentibus duobus infimis aliis paulo tenuioribus, nervis transversis parallelis inter se plerumque 3-7 mm. distantibus pagina superiore conspicuis inferiore prominulis et setosis; petioli foliorum oppositorum inaequales, 1.3-3 cm. longi, teretes, ut caules setosi. *Panicula* ad 12 cm. longa et 2.5 cm. diametro; pedicelli circiter 1.5 mm. longi. *Receptaculum* 3 mm. altum, angulatum. *Calycis* lobi breves. *Petala* 4, ad 2 mm. longa et 2.5 mm. lata. *Stamina* 8, inter se subaequalia, filamentis 3 mm. longis, antheris ad 2 mm. longis. *Stylus* 4 mm. longus. *Capsula* circiter 3 mm. alta, apice in collum 1 mm. altum producta.

Doi Wao, very common in evergreen jungle, 750-1050 m., *Kerr*, 2456.

Yunnan: Szemao, 1200 m., *Henry*, 12993.



*Allomorpha subsessilis*, *Craib* [Melastomaceae-Oxysporeae]; species foliis fere sessilibus basi inaequaliter auriculatis distincta.

*Arbuscula* circiter 4·5 m. alta (ex *Kerr*); ramuli quadrangulares, angulis, praecipue internodii apicem versus, alatis, ad 3 mm. diametro, fistulosi, hic illic parce breviter brunneo-pilosulo-pubescentes. *Folia* anguste oblongo-lanceolata, apice acuminata, acutiuscula, basi inaequaliter auriculata, 15·5–18·5 cm. longa, 3–4·2 cm. lata, supra minute brunneo-puberula, mox glabra, subtus nisi nervis primariis crispatis brunneo-pilosulo-pubescentibus fere glabra, e basi 5-nervia, nervis supra impressis subtus prominentibus, nervis transversis supra leviter impressis subtus prominulis, chartacea vel rigide chartacea, margine apicem versus distanter minute denticulata; petioli foliorum oppositorum parum inaequales, 2–3 mm. longi, crispatis brunneo-pubescentes. *Panícula* terminalis, ad 22 cm. longa, pedunculo communi circiter 6 cm. longo suffulta, ramis inferioribus 13 cm. longis, ramulis circiter 4 cm. longis; pedunculi cymas gerentes ad 1 cm. longi, quadrangulares, parce pubescentes; pedicelli teretes, circiter 2 mm. longi, puberuli. *Receptaculum* circiter 4 mm. altum, breviter puberulum. *Calyx* vix lobatus. *Petala* ad 2·75 mm. longa et 3 mm. lata. *Stamina* 8, inter se subaequalia, filamentis 2 mm. longis, antheris ad 3 mm. longis. *Stylus* vix 7 mm. longus, glaber.

Doi Wao, in evergreen jungle, 300–900 m., *Kerr*, 2427.

*Gynostemma angustipetala*, *Craib* [Cucurbitaceae-Gynostemmeae]; ab affini *G. integrifolia*, Cogn., petalis longioribus angustioribus recedit.

*Caules* primo puberuli, mox subglabri, rubro-brunnei, dein glabri, straminei, sulcati. *Folia* quinquefoliolata, petiolo 1–2·5 cm. longo puberulo supra canaliculato suffulta; foliola plerumque oblonga vel oblongo-oblancoolata, vel infima latere uno dimidiatim ovata, altero dimidiatim oblancoolata, apice subtruncata, mucronata, basi mediana attenuata, infima valde inaequilatera, latere altero rotundata vel fere truncata, altero attenuata, ad 8·5 cm. longa et 3 cm. lata, tenuiter chartacea, pagina utraque pilis brevibus, sed subtus costa nervisque densius, parce instructa, nervis lateralibus utrinque 4–5 obliquis intra marginem anastomosantibus cum costa pagina superiore impressis inferiore prominentibus, nervis transversis obscuris, integra, petiolulis usque ad 1 cm. longis suffulta. *Paniculae* ♂ folia superantes, pedunculo communi petiolo subaequali vel eo longiore puberulo suffultae, rachi ramulisque puberulis; bractee angustae, 2–3 mm. longae; pedicelli graciles, ad 6 mm. longi; flores ad 6 mm. diametro. *Sepala* 5, lineari-lanceolata, acutissima, petalis subaequilonga iisque paulo latiora, ciliata, dorso parce pubescentia. *Petala* 5, sepalis conformia, 0·5 mm. lata, ciliata, dorso parce pubescentia. *Stamina* 5, connata, paulo ultra 0·5 mm. alta.

Chiengmai, Doi Sootep, in mixed jungle, 360 m., *Kerr*, 1332; Ban Pong, in mixed jungle, 390 m., *Kerr*, 1946.

*Nyssa bifida*, *Craib* [Nyssaceae]; a speciebus adhuc descriptis stylis bifidis recedit.

*Ramuli* primo subflavido-pubescentes, mox glabri, cortice brunneo pauci-lenticellato obtecti, ad 5 mm. diametro. *Folia* oblancoolata, oblongo-oblancoolata vel interdum obovato-elliptica, apice acute acuminata, basi cuneata vel late cuneata, 11–27 cm. longa, 5–11 cm.

lata, chartacea vel rigide chartacea, nervis lateralibus utrinque 12-17 fere rectis supra conspicuis subtus prominentibus, nervis transversis pagina superiore conspicuis inferiore subprominulis, supra, costa pubescente excepta, fere glabra, subtus costa nervisque pubescentia vel subglabra, petiolo 1.5-3.5 cm. longo supra planiusculo vel leviter canaliculato pubescente suffulta. *Inflorescentia* ♂ pedunculo communi circiter 1.5 cm. longo tomentello suffulta; pedicelli ad 4 mm. longi, basi bracteati, adpresse pubescentes. *Calycis* lobi breves, extra adpresse pubescentes. *Petala* sub anthesin recurva, oblonga, apice rotundata, ad 2 mm. longa et 1.5 mm. lata. *Stamina* exteriora interioribus multo longiora, filamentis 3 mm. longis glabris. *Discus* carnosus, glaber. *Capitula* ♀ pedunculo communi 2-3 mm. longo tomentello paulo supra medium bracteato suffulta. *Receptaculum* 4 mm. altum, 3 mm. diametro, adpresse pubescens. *Calyx petalaeque* maris sed minora. *Ovarium* uniloculare; stylus 1.5 mm. altus, ramis 2 stylo subaequilongis. *Fructus* subellipsoideus, ad 1.2 cm. longus, fusco-brunneus, parce pubescens. Chiangmai, Doi Soote, in evergreen jungle, 660-900 m., Kerr, 1713, 1716, 2594.

Lao name, Mai kung kak? (ex Kerr).

*Jasminum siamense*, Craib [Oleaceae-Jasmineae]; ob calycis lobos lineares acute acuminatos ad 9 mm. longos minutissime tantum puberulos distinctum.

*Ramuli* graciles, primo puberuli, virides, mox minutissime puberuli, cortice stramineo subnitido obtecti. *Folia* lanceolata, late lanceolata vel ovato-lanceolata, ad apicem mucronatum plerumque gradatim attenuata, basi cuneata vel late cuneata, 3.5-8.5 cm. longa, 2-2.7 cm. lata, membranaceo-chartacea vel fere chartacea, glabra vel superne minute ciliolata, nervis lateralibus utrinque 3-4 supra subconspicuis subtus prominentibus, nervis transversis obscuris, petiolo 4-7 mm. longo minute puberulo vel fere glabro suffulta. *Flores* terminales, solitarii; pedicelli circiter 6 mm. longi. *Calycis* tubus 2.5 mm. altus, lobi 6, lineares, acuminati, acuti vel acutiusculi, 7.5 mm. longi, 1.75 mm. lati, minutissime puberuli, apicem versus minute ciliolati. *Corolla* alba (ex Kerr); tubus 1.6 cm. longus; lobi acuti, ad 2.5 cm. longi et 4 mm. lati. *Antherae* mucronatae, circiter 4.5 mm. longae, fere sessiles. *Ovarium* depresso-globosum, 1 mm. altum, fere 2 mm. diametro.

Between Lākawn and Prê, Ban Mê Ta, in scrub jungle, 450 m., Kerr, 2307.

Lao name, Dawk seo (ex Kerr).

*Holarrhena similis*, Craib [Apocynaceae-Euplumerieae]; *H. Curtisii*, King et Gamble, facie similis sed foliis calycisque lobis majoribus recedit.

*Fruticulus* 60-90 cm. altus (ex Kerr), ramulis primo parce breviter pilosulis mox glabris cortice rubro-brunneo pauci-lenticellato reticulato-striato obtectis ad 6 mm. diametro. *Folia* plerumque oblonga, rarissime elliptico-ovata, apice plerumque rotundata, breviter acuminata, basi rotundata vel leviter cordata, 7-10 cm. longa, 4.5-6.2 cm. lata, chartacea vel chartaceo-coriacea, pagina utraque breviter molliter pubescentia, mox superiore puberula, subtus pallidiora, nervis lateralibus utrinque circiter 13 intra marginem anastomosantibus supra cum costa nervulisque leviter



impressis subtus cum costa prominulis, nervis transversis uti reticulatione subtus conspicuis vel fere subprominulis, petiolo 1-3 mm. longo suffulta. *Inflorescentia* generis; pedicelli circiter 13 mm. longi. *Calycis* segmenta fere 5 mm. longa, basi 1.5 mm. lata, obtusiuscula, ciliolata, dorso ut pedicelli pubescentia, intra superne parce breviter pubescentia; glanduli lobis alterni, parvi. *Corollae* albae (ex *Kerr*) tubus 1.2 cm. longus, extra, ima basi excepta, puberulus; lobi ad 2 cm. longi et 5.5 mm. lati. *Antherae* 1.25 mm. longae, apiculo circiter 0.75 mm. longo coronatae; filamenta antheris breviora, circiter 1.5 mm. e tubi basi affixa. *Ovarium* circiter 1 mm. altum, disco parvo; stylus 1.5 mm. longus. *Folliculi* ad 29 cm. longi, rubro-brunnei, lenticellati, striati, glabri.

Lampung, Mè Ta, in eng jungle, 450 m., *Kerr*, 2548; Prè, near Rawng Kwang, in open spaces in deciduous jungle, 180 m., *Kerr*, 2357.

Lao name, Mai muk (ex *Kerr*).

*Didymocarpus squamosa*, Craib [Gesneraceae - Cyrtandreae]; *D. Kerrii*, Craib et *D. purpureo-pictae*, Craib, affinis, ab ambabus foliis subtus costa nervisque pilis rigidioribus squamiformibus tectis folisque duplo-serratis recedit.

*Herba* perennis, caulescens, 6-14 cm. alta; caulis nodis plerumque satis distantibus albo-pilosulus praeterea pilis longioribus divaricatis praesertim ad nodos instructus, pilis omnibus primo albidis mox brunnescentibus. *Folia* opposita interdum subaequalia, plerumque valde inaequalia, oblonga, elliptico-ovata vel fere elliptica vel subrotundata, 2.3-7.3 cm. longa, 2-5.2 cm. lata, chartacea vel membranaceo-chartacea, pagina superiore primo albo-pilosa, mox brunneo-pilosa, inferiore praesertim ad costam nervosque pilis compressis squamiformibus brunneis densius instructa, ceterum pilosa, parce aureo-glandulosa, nervis lateralibus utrinque 4-5 supra conspicuis subtus prominulis, nervulis subtus conspicuis, margine duplo-serrata vel duplo-crenato-serrata; petioli foliorum oppositorum plerumque inaequales, plantae humilioris ad 2 cm. longi, plantae normalis (vel saltem partis majoris plantarum adhuc collectarum) ad 7 cm. longi. *Inflorescentia* terminalis, pedunculis pilis divaricatis glanduliferis parce instructis exceptis glabra; bracteae glabrae, 3.5 mm. longae, 4 mm. latae. *Calycis* glabri tubus 3 mm. longus, lobi oblongi, apice rotundati vel acutiusculi, 1.5 mm. longi, 1.5 mm. lati. *Corollae* tubus 1.6 cm. longus, limbus 6 mm. longus. *Stamina* glabra, filamentis 3 mm. longis. *Pistillum* 1.7 cm. longum; discus tubularis, stipitis basin cingens, 2 mm. altus. *Capsula* acuminata, ad 2.5 cm. longa.

Chiengmai, Doi Sootep, on damp rocks in evergreen jungle, 900 m., "corolla tube mauve, limb purple," *Kerr*, 2636.

*Cleistanthus siamensis*, Craib [Euphorbiaceae-Phyllanthaeae]; ab affini *C. malabarico*, Muell.-Arg., ramulis eorumque indumento conspue tenuioribus facile distinguendus.

*Ramuli* graciles, primo ferrugineo-tomentosi, mox puberuli vel subglabri, pauci-lenticellati. *Folia* oblongo-lanceolata, oblanceolata vel oblongo-oblanceolata, apice acuminata, obtusa vel acuta, basi inaequalia, plerumque late cuneata, ima basi latere utroque auriculata, 4.5-14 cm. longa, 1.3-4.6 cm. lata, chartacea, juventute pagina inferiore pilosula, superiore costa parce ferrugineo-hirsuta,

mox glabra, nervis lateralibus utrinque 9-11 intra marginem anastomosantibus supra conspicuis subtus prominulis, nervis transversis pagina utraque conspicuis; petioli validiusculi, 3 mm. longi, puberuli vel breviter pubescentes; stipulae deciduae, 5-6 mm. longae, basi vix 1 mm. latae. *Inflorescentia* axillaris, glomerata. *Flos* ♂. *Calycis* carnosi tubus 1.25 mm. longus, lobi inter se subaequales, 2 mm. longi, vix 1 mm. lati. *Petala* parva, transverse oblonga, longe cuspidato-acuminata vel tricuspidata. *Stamina* 5, filamentis ima basi connatis ovarii rudimentum cingentibus. *Flos* ♀. *Calyx* corollaque maris sed calyce parum majore. *Ovarium* 1.5 mm. altum, dense adpresse albo-hirsutum.

Srirācha, 4.5 m., *Mrs. D. J. Collins*, 16.

*Phyllanthus Collinsae*, *Craib* [Euphorbiaceae-Phyllanthaeae]; *P. polyphylo*, Willd., facie similis ovario conspicue verrucoso facile distinguenda.

*Ramuli* graciles, glabri, lignosi, fusco-corticati; ramuli ultimi alterni, graciles, recti, folia pinnata simulantes, ad 18 cm. sed plerumque 7-10 cm. longi, glabri. *Folia* oblonga, apiculata, basi inaequalia, late cuneata vel rotundato-cuneata, 1-2 cm. longa, 3-5 mm. lata, apicem versus ramulorum gradatim breviora, tenuiter chartacea, utrinque glabra, subtus pallidiora, nervis lateralibus utrinque 9-10 intra marginem anastomosantibus pagina superiore obscuris vel subobscuris inferiore conspicuis, margine revoluta, petiolo perbrevis suffulta. *Ramuli* ultimi floriferi, androgyni, inferne in foliis normalibus flores masculos vel interdum superne et flores paucos femineos gerentes, summo apice aphylli vel subaphylli, flores femineos et interdum flores paucos masculos gerentes. *Floris* masculi pedicelli pergraciles, 2-3 mm. longi, glabri. *Sepala* 6, inter se subaequalia, 1 mm. longa. *Columna* staminalis 1.5 mm. alta; antherae 3, vix 0.5 mm. longae. *Pedicelli* floris feminei 4 mm. longi, pedicellis maris valde robustiores. *Sepala* 6, 3 exteriora 1.75 mm. longa, 0.75 mm. lata, interiora 2 mm. longa, 1.25 mm. lata. *Discus* parvus, margine fimbriatus. *Ovarium* 1.5 mm. altum, valde verrucosum; styli 3, liberi, bifidi.

Srirācha, 4.5 m., *Mrs. D. J. Collins*, 12, *Kerr*, 2036.

## VII.—MAHOGANY BORERS OF THE GOLD COAST.

T. F. CHIPP.

The general method of timber extraction on the Gold Coast is for a tree, after being felled and cut into logs, to be hauled by manual labour to the nearest stream. The logs are then floated down and collected into rafts at the mouths of the main rivers.

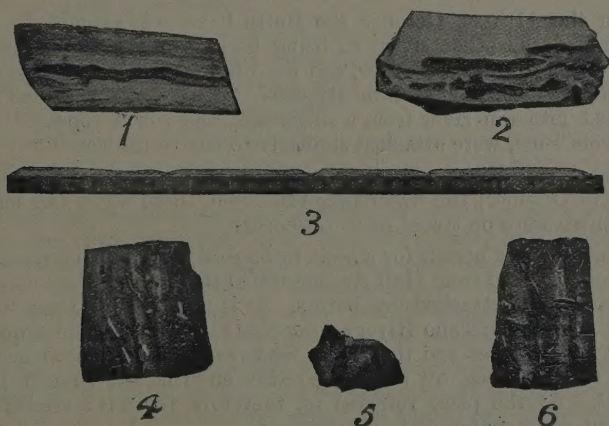
In 1912 the abnormal summer in England was reflected on the Coast in an unusually low rainfall and high tides, particularly during the month of August. Owing to the small volume of water coming down, the river currents were not very strong and, the tides being high, most of the rivers obtained free access to the sea for a short time only, after which the sand bars again closed across their mouths. It was exceedingly difficult, on this account, to take any rafts out to



sea and anchor them in the beach coves to await shipment as is the usual custom. When the number of logs was greatest, about the beginning of August, the presence of worm borers was reported.

**Occurrence.**—Enquiries amongst local timber firms and of natives elicited the facts that worm borers have appeared at any rate for the last seven years and probably long before that, although their numbers and the extent of the damage done varies with the seasons. All are agreed, however, that the attack which began this year in August has been far worse than any that can be remembered. Each river mouth where logs had been collected was reported to show the same conditions, namely, a slow river current, a sand bar, and a fringe of the mangrove association, and, with one exception, all logs in such localities were bored. The one exception was afforded by some logs anchored at a spot in the Ancobra River mouth where no mangrove existed.

In former years, as now, the worms first appeared between the big and the small rains when the river current is sluggish and tides are high. In the case of those logs which were up river when the outbreak occurred no signs of bores were reported. Similarly those logs that were taken straight out to sea were found to have escaped, and in those that had been attacked the borers were reported to die on exposure to sea water.



- 1 and 2. Longitudinal sections of a mangrove stem, showing burrows made by *Teredo*.
3. A *Teredo* measuring 29 inches long.
4. Tangential longitudinal section of mahogany log, showing *Xylophaga*.
5. Transverse section of same.
6. Radial longitudinal section of same.

The majority of the representatives of local timber firms were of the opinion that old and new timber was attacked equally. Some, however, stated that old logs were attacked worse than new, whilst others again thought that the new only were attacked. Barked or unbarked timber fared equally badly, and a steam launch belonging to the Mengel Mahogany Company, which was built of European timber, had to be protected with a metal covering.

In some cases the rate of boring was stated to depend on the age of the worm or to vary with the hardness of the timber. All were agreed, however, that it was about  $\frac{1}{8}$  inch daily.

On 4th October, in company with Dr. R. O. White and Mr. Langton of Messrs. Rusts, a visit was made to the Ancobra River mouth. The part examined extended about one mile from the beach, the water was tidal and distinctly brackish, there was a slow river current, and along both river banks a fringe of mangrove. Considerable numbers of rafts were lying in the river chained up to the mangrove and all logs examined were found to be attacked.

On 7th October the mouth of Prince's River was examined in company with the Mengel Mahogany Company's representative stationed there. As in the case of the Ancobra the river was completely closed by a sand bar and there was consequently hardly any current. There is an extensive mangrove formation extending at least a mile up river, and the water was decidedly brackish. Solid mahogany logs lying near the mouth of the river and which were stated to have been there at least two seasons were perfectly honey-combed and could easily be broken up by hand. Logs of *Eriodendron anfractuosum* lying in the water were also found to be attacked. Dead branches of shrubs lying in the river were all found bored, but with no recent traces of borers.

On the 11th of October the Butre River was examined. This resembled the other rivers in being barred, in having a mangrove association in brackish water, and but little current. All logs lying in the river were found to be attacked. Some poles that had been washed into the river from a shipwreck, and which appeared to be of Scots Pine, were attacked similarly to native timber.

The Butre River was examined above the mangrove association on 12th October; the water here was fresh, there was a fair current and there were no traces of worm-borers.

Time did not permit for a visit to be paid to any other rivers, but a report received from Half Assinie stated that no logs were observed to have been attacked by borers. It is necessary to state that at Half Assinie the Tano River approaches to within two and a quarter miles of the coast and then turns westwards and does not communicate with the sea till some time after entering the French Ivory Coast. At the place referred to, therefore, there is a strong river current, fresh water, and no mangrove.

After the visit to the Ancobra River a few experiments were attempted, but owing to the difficulty of extracting the borers from the logs, on account of the sinuous character of the burrows, they are not altogether reliable. The experiments, which were conducted on an open verandah near the sea and exposed to indirect sunlight, gave the following results.

Pieces of timber containing borers were immersed in sea water, brackish water and rain water. Those borers which were exposed to pure sea water turned brown within two hours of submersion, and in fifteen hours were in a high state of decomposition. Those immersed in pure rain water appeared to die within six hours and had begun to decompose in fifteen hours. The control experiment in brackish



water which had been taken from a worm-infested locality shows that the worms had undergone little change, if any, in fifteen hours.

It would appear that three factors are associated with the presence of borers. They are a sluggish river current, a certain mixture of salt and fresh water, and the presence of the mangrove formation. The two latter factors are intimately connected, but the absence of the first is sufficient to prevent borers appearing in any quantity, probably owing to the fact that the river current carries away the young fry.

The borer belongs to the genus *Xylotrya*, which differs from *Teredo* in the construction of the palet, and is probably a new species. It enters the log from its stage as a free swimming fry by a minute hole and bores its way into the wood, quickly enlarging the size of the bore till it measures about  $\frac{1}{8}$  inch in diameter. At this stage the borers do not exceed ten inches in length. No general direction is followed, but in no case was any indication seen of connections between neighbouring burrows.

Mr. E. A. Smith of the British Museum has kindly identified the borer.

**Suggested Methods of Protection.**—In view of the large pecuniary loss sustained by some timber firms this year a method of protecting the logs would be welcomed.

Mr. R. S. Pearson, Forest Economist to the Indian Government, states in the Indian Forest Records iii., 2, that there is no anti-septic treatment yet discovered that can be recommended as an effective prevention of these borers.

Local observation shows that the natives' canoes are never attacked. In this case the canoes are always hauled out of the water when not in use, but such a proceeding with large rafts is hardly practicable. It suggests, however, the advisability of selecting for anchorage those stretches along the river bank where there is no mangrove. Observation of a raft belonging to the Talge Mahogany Company showed that logs anchored for three months in the Ancobra mouth at a spot where there was no mangrove had hardly any bore holes, although the river above this place was full of infested logs.

It can only be recommended, therefore, that when it is impossible to take rafts out and anchor them at sea, they should not be tied to mangrove, and if possible they should be hauled out of the water.

Whilst investigating the rafts of logs the mangrove trees were also examined. All the larger roots and stems were found bored below high-water level, and in some cases the borers had travelled at least six feet inside the stem. On cutting across a burrow above a borer a white watery fluid exuded freely. These borers measured from one to nearly three feet in length and had a bore with a diameter of  $\frac{1}{2}$  to  $\frac{5}{8}$  inch. Mr. E. A. Smith has identified them as an undescribed species of *Teredo*, specimens of which were previously collected by Sir Alfred Moloney in Lagos about 1891.

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## VIII.—DIAGNOSES AFRICANAE: LII.

1421. *Arabis albida*, *Stev.*, var. *elata*, *Sprague* [Cruciferae]; habitu elato, foliis caulinis superioribus ligularibus parvidentatis a typo recedit.

*Herba* 4–6 dm. alta, erecta vel inferne subascendens. *Folia* caulina inferiora ligulari-oblongata vel anguste oblanceolata, circiter 6 cm. longa, 1.2–1.3 cm. lata, parvidentata; folia superiora ligularia, 3.5–6.5 cm. longa, 0.8–1 cm. lata, basi sagittato-auriculata. *Glandulae disci* valvariae (laterales) obtusae vel rotundatae, iis typi breviores. *Pedicelli fructiferi* patentes, 1.5–1.7 cm. longi. *Siliquae* 2.5–5 cm. longae, stigmate sessile terminatae.

TROPICAL AFRICA. Uganda: Mt. Ruwenzori, 3600–3900 m., *Dawe*, 589. *Doggett*. Ruwenzori; Mabuka Valley, *Kässner*, 3135. German East Africa: Mt. Kilimanjaro, 2400–3300 m., *Johnston*, 23, 141.

The type of the new variety is *Dawe's* No. 589.

1422. *Strephonema apolloniensis*, *J. J. Clark* [Combretaceae]; species *S. sericeae*, *Hook. f.*, affinis, sed inflorescentiis simplicibus, foliis et floribus majoribus, antheris multiseptatis, tomento coarctato differt.

*Arbuscula* sempervirens, ramulis teretibus longitudinaliter striatis breviter pubescentibus. *Folia* alterna, elliptica, apice subacute cuspidata, basi rotundata, 18.5–27 cm. longa, 6–8 cm. lata, coriacea, supra glabra, infra in costa et nervorum axillis pilis coarctatis bifurcatis rufo-brunneis pubescentia, nervis lateralibus utrinque 9–11 prominentibus obliquis, venis infra distinctis subparallelis; petioli 1 cm. longi, pilis rufo-brunneis obtecti. *Flores* in racemos axillares 4–7 cm. longos dispositi. *Racemi* pilis rufo-brunneis obtecti; bracteae 3–4 mm. longae, lanceolatae, concavae, 4 mm. longae. *Calycis* *tubus* campanulatus, 5 mm. longus, extra breviter pubescens, intra glaber; lobi 5, late triangulares, intra apice tomentosi, 3 mm. longi, 4 mm. lati. *Petala* 5, oblonga, apice rotundata et inflexa, 7 mm. longa, 3 mm. lata, ciliata. *Stamina* 10, 2-seriata, longe exserta, exteriora petalis opposita, antherae versatiles, triangulares, transverse multiseptatae, 1.5 mm. longae; filamenta filiformia, 1–1.5 cm. longa. *Ovarium* subglobosum, calycis tubo semi-adnatum, uniloculare, 3 mm. longum; ovula 2, sub apice loculi pendula; stylus 1.6 cm. longus. *Fructus* non visi.

TROPICAL AFRICA. Gold Coast: North Kwanta; W. Apollonia, small tree in tall evergreen forest, *Chipp*, 332.

1423. *Combretum* (Grandiflorae) *tarquense*, *J. J. Clark* [Combretaceae-Combreteae]; species *C. hispido*, *Laws.*, affinis, sed foliis et floribus minoribus, inflorescentia simpliciore differt.

*Frutex* scandens, ramis novellis glanduloso-hispidis adultis lignosis glabrescentibus. *Folia* opposita, oblonga, basi truncata, apice gradatim vel cuspidatim acuminata, 8–12 cm. longa, 2–4 cm. lata, glabra, subtus pallidiora, nervis lateralibus utrinque 6–7 supra paulo immersis infra prominentibus intra marginem anastomosantibus, venis infra distinctis; petioli hirti, 3–4 mm. longi, basi geniculata et persistente. *Flores* rubri in spicam terminalem dispositi; rhachis



spicae 5-7 cm. longa, rufo-hirta; bracteae subulatae vel lanceolatae, 7.5 mm. longae, extra tomentosae, marginibus incurvis. *Calycis dentes* 5, late triangulares, 1 mm. longi, ciliati. *Petala* 5, oblonga, apice obtusa, 2.5 mm. longa, 2 mm. lata, glabra. *Stamina* 10, longe exserta; filamenta 6 mm. longa; antherae oblongae, versatiles, 5 mm. longae. *Receptaculum* inferum elongato-fusiforme, 3.5 mm. longum, superum 2.5 mm. longum, late campanulatum, extra parce pubescens, inferne intra glabrum, superne intra pilosum. *Fructus* non visi.

TROPICAL AFRICA. Gold Coast: Suku Suku, Chipp, 10; Tarkwa, Thompson, xliii.

1424. *Stephanorossia Elliotii*, J. J. Clark [Umbelliferae-Laserpiticeae]; species *S. palustri*, Chiov., affinis sed caulibus floriferis flaccidis, involucri et involucelli bracteis, fructus magnitudine differt.

*Herba*. *Caules* floriferi flaccidi. *Folia* triternata, segmentis ultimis ovatis glaberrimis membranaceis argute serratis vel inciso-serratis basi rotundatis apice acutis 12 mm. longis 6-10 mm. latis; vagina 1-1.5 cm. longa. *Umbellae* axillares; pedunculi 1.4-3 cm. longi. *Involucrum* ex bractea solitaria lineari 1 cm. longa constitutum; radii 5 vel 6, 1-1.2 cm. longi. *Bracteae involucelli* lineari-filiformes, acutae, 5.5 mm. longae. *Flores* umbellularum 8-14, pauci aliquando steriles; pedicelli 1-2 mm. longi. *Calycis dentes* lineares, acuti, 0.5 mm. longi. *Petala* apice incurvata, minuta, 0.75 mm. longa. *Fructus* 2 mm. longi, 1.5 mm. lati, commissura (parte contigua) 1 mm. lata.

TROPICAL EAST AFRICA. Ruwenzori: by a small stream on rocks. 317 m., Scott-Elliott, 7791.

The genus *Stephanorossia* was published in 1911 by Dr. Chiovenda in *Annali di Botanica* (vol. ix. p. 65). It is founded on material collected in Abyssinia (*S. palustris*, Chiov.) which, from the description, seems to be identical with No. 372 of Mr. G. S. Baker's collection—said to grow in stream beds and marshy places at Mau.

1425. *Conopharyngia Chippii*, Stapf [Apocynaceae-Tabernaemontanoideae]; ab omnibus species sectionis *Sarcopharyngiae* magnitudine florum et tubo longo crassissimo facile distincta.

*Arbor* parva, glaberrima, 5-6 m. alta. *Folia* lanceolata vel lanceolato-oblonga, basi acuta vel subacuta, apice breviter acuminata, 18-25 cm. longa, 5-8 cm. lata, papyracea, nervis utrinque 8-10; petiolus 1 cm. longus; stipulae intra-petiolares obtusissimae, breves. *Inflorescentiae* subcorymbosae; pedunculus crassus, circiter 7 cm. longus; bracteae superiores ovatae, minutae; pedicelli robusti, 1.5-2.5 cm. longi. *Calyx* 2 cm. longus; sepala latissime ovata, obtusissima, marginem versus tenuia, minute ciliolata, intus basi glandibus numerosis parvis stipata. *Corolla* crenea; tubus subcylindricus, medio paulo dilatatus, 7-8 cm. longus, infra stamina tenuis, supra ea crassissime carnosus via angustissima intus praeter lineas 5 pubescentes glaber; limbi lobi oblique late ovati, obtusi, vix 2 cm. longi, glabri. *Stamina* paulo infra medium inserta, antherae 2.5 cm. longae, brevissime sagittatae. *Stylus* 3 cm. longus;

stigma cylindricum, 8-9 mm. longum, basi annulatim incrassatum. *Ovarium* sensim in stylum abeuns; ovula pluriseriata, numerosissima.

TROPICAL AFRICA. Gold Coast: Gemma, near the western frontier, in moist evergreen forest, Chipp, 353.

1426. *Ervatamia Methuenii*, Stapf et M. L. Green [Apocynaceae-Tabernaemontaneae]; affinis *E. modestae*, Stapf (*Tabernaemontanae modestae*, Baker), sed foliis lanceolatis magis gradatim acuminatis, floribus fere duplo minoribus.

*Frutex* glaberrimus, ramis teretibus. *Folia* lanceolata, sensim acuminata, basi acuta, 4-5.5 cm. longa, 1-1.3 cm. lata, vix coriacea, nervis lateralibus tenuissimis utrinque circiter 10 obliquis, subtus pallida. *Inflorescentia* cymosa, alaris, pauciflora, laxa, pedunculo 5-12 mm. longo, bracteis scariosis parvis citissime deciduis, pedicellis gracilibus ad 5 mm. longis. *Calyx* 1 mm. longus; sepala ovato-rotundata, obtusa, eciliolata, basi intus circiter 5 glandulis munita. *Corolla* alba vel in sicco lutescens, tubo cylindrico glabro nisi intus infra stamina minute puberulo 4 mm. longo, 1 mm. diametro, lobis oblongis circiter 4 mm. longis. *Stamina* circiter 2 mm. supra basin inserta, inclusa; antherae a stigmate liberae, subsagittatae, cum brevissimis appendicibus ad 1.5 mm. longae. *Ovarium* glabrum; stylus circiter 2.5 mm. longus; stigma basi annulo cinctum, viscosum, oblongo-cylindricum, bifidum, lobis papillois lanceolatis.

SOUTH MADAGASCAR. Near Beloha, Methuen.

1427. *Serruria Bolusii*, Phillips et Hutchinson in Dyer, Fl. Cap. vol. v., p. 662, anglice [Proteaceae-Proteae]; affinis *S. adscendenti*, R. Br., sed bracteis costatis glabris, pedunculis ultimis glabris differt.

*Caules* erecti; rami glabri. *Folia* pinnatim vel bipinnatim dissecta, glabra, 2-4.5 cm. longa, segmentis ultimis anguste cylindricis acute mucronatis 0.8-1 cm. longis. *Capitula* 4-12, in pedunculo communi corymbosim disposita; pedunculus 2 cm. longus, bracteis lineari-lanceolatis glabris 5 mm. longis demum reflexis instructus; pedunculi ultimi 4-6 mm. longi, glabri, basi unibracteati. *Bracteae floriferae* ovatae, longe acute acuminatae, 3-6 mm. longae, costatae, glabrae vel minutissime pubescentes. *Flores* in alabastro curvati. *Perianthii tubus* 1.5 mm. longus, superne pubescens, inferne glaber; segmenta 5-6 mm. longa, breviter appresse hirsuta; limbus oblongus, subacutus, circiter 2 mm. longus, appresse hirsutus. *Antherae* 1.5 mm. longae. *Squamae hypogynae* 1-1.5 mm. longae, filiformes. *Ovarium* ellipsoideum, albo-pilosum; stylus 6-7 mm. longus, basi incrassatus et articulatus; stigma cylindricum, obtusum, sulcatum, vix 1.5 mm. longum. *Fructus* oblongo-ellipsoidei, rostrati, 5 mm. longi, villosi.

SOUTH AFRICA. Coast Region: Bredasdorp Div.; near Elim, Bolus, 8589, Schlechter, 9651 partly; without precise locality, Thom, 787.

1428. *Thesium Rogersii*, A. W. Hill [Santalaceae]; species *T. gracile*, A. W. Hill, affinis, sed caulibus crassioribus floribus majoribus in racemis dispositis, antheris stylisque longioribus praecipue differt.



*Suffrutesc.*, caules numerosi, erecti, superne ramosi, 15-20 cm. alti, conspicue angulati et sulcati. *Folia* inferne squamiformia, superne linearia vel lineari-lanceolata, acuta, 0·6-1 cm. longa, apice brunnea. *Inflorescentia* terminalis, racemosa; flores sessiles, singuli, rarius in cymas 3-floras in axillis bracteae dispositi; bracteae anguste ovato-lanceolatae, acutae, carinatae, carnosulae, 4 mm. longae, floribus aequilongae, bracteolae 2, circiter 3 mm. longae. *Perianthium* 3·5 mm. longum, segmentis 2 mm. longis elliptico-lanceolatis cucullatis apice dense barbatis. *Antherae* 0·75 mm. longae. *Stylus* 1·25 mm. longus, medio antherarum attingens. *Fructus* ovoideus, 3-4 mm. longus, costis 10 conspicuis reticulationibus tenuibus instructus.

TROPICAL AFRICA. S. Rhodesia: Victoria Falls; Candahar Island, 915 m., *Rogers*, 5467.

1429. *Croton subgratissimus*, *Prain* [Euphorbiaceae-Crotonae]; species *C. gratissimo*, Burch. et *C. Welwitschiano*, Muell. Arg., quam maxime affinis ab ambabus tamen foliis supra persistenter stellato-puberulis facillime distinguenda.

*Arbuscula* 1-4-metralis; rami saepissime ternatim verticillati; ramuli angulati, lepidoti; cortex aromaticus. *Folia* trita fragrantia, alterna, in apice ramulorum subapproximata, distincte vel longe petiolata, coriacea, penninervia, ovato-lanceolata, acuminata, apice ipso emarginata, basi minutissime cordata, margine integra, 3-9 cm. longa, 1·25-3 cm. lata, supra crebre persistenter stellato-puberula, subtus lepidibus argenteis hinc inde medio fuscis vestita; nervi laterales utrinsecus 12-14, supra visibiles nec tamen impressi nec elevati, subtus haud visibiles; nervus medius supra impressus, subtus elevatus; petiolus canaliculatus, lepidotus, 1-3·5 cm. longus apice glandulis 2 sessilibus instructus; stipulae subulatae, lepidotae, saepissime perparvae, nonnunquam 5-6 mm. longae. *Racemi* terminales, androgyni; rhachis lepidota; bracteae 4-florae, subulato-lanceolatae, 1 mm. longae, lepidotae; pedicelli 3 mm. longi, lepidoti. *Flores* utriusque sexus alabastro globosi, extra lepidoti. *Calyx* maris profunde 5-partitus, lobis ovatis obtusis intus pubescentibus. *Petala* 5, ovata, obtusa, extra parce lepidota, margine villosa, intus ceterum glabra. *Stamina* 15-20; filamenta parce pubescentia; receptaculum pilosum; glandulae disci crassae, glabrae. *Calyx* feminei ei maris simillimus. *Petala* 5, oblongo-lanceolata, obtusa, extra lepidota, intus hirsuta. *Discus hypogynus* perparvus. *Ovarium* dense lepidotum, 3-loculare, loculis 1-ovulatis; styli patentes 6-8-partiti, glabri. *Capsula* parum 3-lobum, 8-9 mm. longum, dense lepidotum. *Semina* laevia.

TROPICAL AFRICA. Lower Guinea: German South-west Africa; Hereroland, Okahandja, 1340-1675 m., *Hopfner*, 44, *Marloth*, 1354, *Dinter*, 229; Otjivazandu, *Rautanen*, 571; Ombika, *Rautanen*, 572.

Mozamb. Dist.: Tropical Western Bechuanaland; Olifant's Kloof, *Fleck*, 452a, 453a.

SOUTH AFRICA. Kalahari Region: Temperate Bechuanaland; Lobatsi, *Marloth*, 3331. Transvaal; Macalisberg, *Engler*, 2767; Wonderboompoort, near Pretoria, *Rehmann*, 4552, *Ieendertz*, 270, *Rogers*, 233, *Burt Davy*, 1849, *Fehr*, 54.

This species is very nearly related to *C. Welwitschianus*, Muell. Arg. in Journ. Bot. i. 338 (Nov. 1, 1864), which is included in *C. zambesicus*, Muell. Arg. in Flora, xlvii., 483 (Oct. 5, 1864). The only tangible difference between the two species proposed by Müller is that in *C. Welwitschianus* the stipules are only 2-3 mm. long, whereas in *C. zambesicus* they are 4-6 mm. long. Much the same difference is met with in *C. subgratissimus*, the specimens from the Transvaal having stipules 4-5 mm. long, those from Bechuanaland and Hereroland having stipules 2 mm. long or less. *C. subgratissimus*, while most nearly related to *C. zambesicus*, owing to the texture of its leaves, bears a greater general resemblance to *C. gratissimus*, Burch. From both of these species, however, it is at once distinguished by having the upper surface of the leaves persistently stellate-puberulous instead of glabrous.

1430. *Droguetia Thunbergii*, N. E. Brown [Urticaceae-Urticeae]; affinis *D. diffusae*, Wedd., sed foliis crenatis subtus glabris, involucri intra lanato et patria differt.

*Herba* perennis. *Rami* prostrati, graciles, radicales, tetragoni, glabri vel prope basin pubescentes. *Folia* opposita, petiolata, supra sparse pubescentia, subtus glabra; petioli 2-8 mm. longi, graciles; lamina 0.8-2.5 cm. longa, 0.4-1.5 cm. lata, ovata, acuta vel acuminata, basi rotundata vel latissime cuneata, crenata vel serrato-crenata; stipulae ovatae, mucronato-acutae, membranaceae. *Involucra* in singulis axillis 1 vel 2 feminea, tubuloso-urceolata et 1 bisexuale, campanulatum, apice breviter dentatum, omnia extra glabra, intra lanata. *Flores* masculi in involucri bisexuali 6-8, uniseriati, cum flore femineo unico solitarii; perianthio apice acuto, dorso pilis minutis uncinatis sparse pubescente. *Achaenia* compresso-ovata, acute unicarinata, glabra.

SOUTH AFRICA. Swellendam Div.: in the forest at Grootvaders Bosch, Burchell, 7232; in woods, without precise locality, Thunberg.

As no other than the above collectors seem to have found this plant, and as Thunberg went to Grootvaders Bosch, he probably collected it there. His specimens are absolutely identical in every way with those of Burchell.

Thunberg, when writing the names on the sheets containing his specimens of *Urtica capensis* and *U. caffra*, appears to have done so without a very close examination of them, and has therefore produced some confusion. These two species are represented in his Herbarium by five specimens, mounted on separate sheets, which I enumerate below, giving the modern name of the plants with which I find them to be identical:—

“*Urtica capensis*  $\alpha$ ” = *Droguetia Thunbergii*, N. E. Br.

“*Urtica capensis*  $\alpha$ ” = *Australina capensis*, Wedd.

“*Urtica capensis*  $\beta$ ” = *Australina capensis*, Wedd.

“*Urtica caffra*  $\alpha$ ” = *Droguetia Thunbergii*, N. E. Br.

“*Urtica caffra*  $\beta$ ” = *Australina acuminata*, Wedd.

It will be noted that two sheets of *U. capensis* are marked as “ $\alpha$ ” sheets, but upon a careful comparison of the specimens with Thunberg’s description it is quite clear that neither of the “ $\alpha$ ” sheets of *U. capensis* nor the “ $\alpha$ ” sheet of *U. caffra* can be taken



as the types of those species, for it at once becomes perfectly obvious from the characteristics of habit and branching that his description of *U. capensis* so perfectly coincides with the specimen marked "*Urtica capensis*  $\beta$ ," and with no other, that it was certainly made from that specimen, and that neither of the sheets marked "*a*" were taken into account at all. Therefore the specimen marked "*Urtica capensis*  $\beta$ " must be taken as the type of that species.

Likewise with *Urtica caffra*, only the specimen marked "*Urtica caffra*  $\beta$ " agrees with his description of that species, and it does so most accurately, especially as to the particulars he gives relating to the stem and branches, and must therefore be accepted as the type of *Urtica caffra*, Thunb., whilst the specimen on sheet "*a*," by its prostrate rooting stems and opposite leaves, is so distinctly opposed to Thunberg's description of *U. caffra*, that he cannot have used it for that description.

The bisexual involucre of *Droguetia Thunbergii* on dissection are puzzling, owing to the manner in which the perianths of the male flowers seem to cling to the inner side of the involucre; they do not seem to be adnate to it, but appear to be held there by the wool, and it is difficult to separate them. When one had been freed, the mystery was explained by finding that the outside of the perianth of the male flowers was beset with minute hooked hairs, which are entangled in the wool on the inside of the perianth and so prevent separation.

## IX.—ECONOMIC NOTES: LIVERPOOL.

J. M. HILLIER.

The following notes on Vegetable Economic Products were compiled during a recent visit made for the purpose of investigating certain products of irregular import into this country. Previous records on the same subject have appeared in *Kew Bulletin*, 1907, p. 61, and 1908, p. 183.

**TIMBERS.**—In the docks large quantities of timber were to be seen, including the following:—

From West African ports mahogany of various dimensions, both in the round with or without the bark on, and in squared logs. Much of this timber is transhipped to the United States of America. Of particular interest was a parcel of African oak (*Lophira alata*) from the Cameroons. Mr. James A. Weale, a well-known local timber merchant, kindly furnished me with the following particulars of this timber. "Owing to its great weight and the difficulties of shipment obtaining on the African Coast, this timber although well known in certain circles has not up to the present found the demand which its virtues deserve. Only isolated logs have come to this market and these from the Gold Coast where it is known as 'Karkoo.' It is there the favourite wood for railway sleepers and heavy constructional work generally. It is now being imported from Duala in the Cameroons, and the first shipments just to hand mark an epoch in the West African trade. This is the first import that

is in sympathy with the wishes of the consumer here. The logs are well sawn on four sides, of sizes from 16 ins. to 28 ins. square and 12 to 25 feet long. The quality may be described as excellent, and such logs in any kind of timber are very seldom seen. We understand it is proposed to introduce this wood for street paving for which purpose it would probably prove very satisfactory. Its structure, hardness and undoubted durability place *Lophira* wood in the front rank and enable it to compete with other timbers suitable for the purpose mentioned." It may here be noted that African oak or teak (*Oldfieldia africana*), formerly imported into this country from Sierra Leone for shipbuilding purposes, is practically unknown in commerce at the present day.

Some logs of Gaboon mahogany or Okoumé (*Boswellia Klaineana*) were also observed. This timber is employed in France in turnery, carpentry, for cabinet work and marquetry. The natives of the Gaboon form their large canoes or dug-outs from the trunk of this tree. "Brococo" or Sapeli wood from the Benin district was also observed. This timber has a fragrant odour and is one of the African mahoganies. It is believed to be furnished by a species of *Entandrophragma*.

From Usambara, German East Africa, an unfamiliar timber was noted. This I found upon enquiry is known as East African cedar (*Juniperus procera*) and is apparently the wood referred to under the heading of "Substitute woods for Pencils" in the "Timber News," November 1912, p. 4. "Recently they have discovered in German East Africa a species of cedar which, while not as perfect in its essential requirements as the red cedar (*Juniperus*), nevertheless fulfils them in a high degree. It has a fine, straight, and almost even grain; it is just as brittle and nearly as soft as the red cedar; it has a beautiful dark-red colour; is of an even texture and should polish well; is non-resinous, of a light weight and has the pronounced cedar odour. It is reported that there are large quantities of this wood available and that the foreign manufacturers are at the present time using considerable quantities of it." During 1910, 31,000 logs of East African cedar from West Usambara were landed in Germany.

Amongst other unfamiliar woods noted may be mentioned some planks of "Eng" from Rangoon. This is the wood of *Dipterocarpus tuberculatus* described by Gamble in "A Manual of Indian Timbers" as a large deciduous forest tree of Burma. The wood is dark red-brown and hard and is probably the best of the woods yielded by species of *Dipterocarpus*, and is in considerable demand and use for building and boats. Were it not that Burma has so many valuable timbers and especially teak (*Tectona grandis*), Eng would probably be in even greater demand.

In the Canadian and American dock sheds and on the quays a large variety of timbers may generally be found. Many of the following were to be seen in considerable quantities:—Oak, elm and pitch pine planks and boards from New Orleans. Various dimensions of black walnut, poplar, maple, gum, whitewood, birch, satin walnut, hazel pine, cottonwood, pine deals and other familiar woods of regular import. In the same dock sheds were noted from the Tropics, lignum vitae, lancewood spars, ebony, partridge wood from Maracaibo; the

latter is very subject to heartshake. Degami spars (*Calycophyllum candidissimum*) from the West Indies; this wood is elastic, breaks with a long fracture, is very similar to lancewood with which it is frequently confused, and is valued for golf sticks, fishing rods, &c. Other timbers that could not be readily recognised were also to be seen. On one of the quays were some fine spars of Oregon pine (*Pseudotsuga Douglasii*) from British Columbia, some being shaped 7-sided whilst others still had the bark on. This is a valuable timber for structural purposes, being employed in shipbuilding, for bridge work and in the construction of wharves. Some 10-ft. logs of persimmon (*Diospyros virginiana*) with the bark on from Savannah were also noted. The wood is of a dark brown colour and is valued for weaving shuttles, turnery, golf sticks, shoe-last, &c. St. John's pine in the round and squared; Quebec birch in short logs and some irregularly shaped lengths of St. John's birch, the latter being roughly squared and so imported for chair-making.

There was much converted or partially converted timber to be seen during the time of my visit, the following being especially noted:—Cases of match-blocks of *Pinus Strobus* from Boston; crates of spade and shovel-handles of ash and large numbers of maple shoe-last in the rough from Canada, 12 to 20 ft. lengths of 5 by 5 ins. squares of Columbian pine (*Pseudotsuga Douglasii*) known as "roller squares" used for making cotton-mill rollers; bundles of hickory (*Carya* sp.) for making golf sticks; oak staves for casks from New Orleans; short lengths of birch 2 ft. by 2½ ins. for making bobbins; maple and birch prepared for flooring; oak and maple strips for kegs; also many maple rollers shaped octagonally and tarred on the ends to prevent splitting.

Several of the timber yards were visited, including that of Messrs. Joseph Gardner & Sons. Quoting from the "Timber News" of November 16th, 1912, this firm is referred to in the following words. "The concern occupies a premier position inasmuch as they are specialists in almost all kinds of hardwoods, and hold stocks of many timbers with which the trade in general is hardly acquainted. They draw for their supplies on practically every country in the world." Many interesting timbers were noted in this yard including the following:—Persimmon (*Diospyros virginiana*), Knysna boxwood (*Gonioma Kamassi*), wood hard and close-grained used principally for tool-handles, in turnery for yoke skeys and for weaving shuttles, West Indian boxwood (*Tecoma* sp.), likewise used for shuttles, Persian boxwood (*Buxus sempervirens*). Until the previous year no direct shipments of this wood had been made for 20 years; Turkish walnut (*Juglans regia*) used for gun-stocks, cabinet work, &c. Hassagay wood (*Curtisia faginea*), a tough, strong and elastic wood from South Africa, valued for wheel-work, tool-handles and weaving shuttles. Two varieties of ebony known as Macassar and Madagascar, believed to be furnished by species of *Diospyros*; Mountain satin wood (*Fagara flava*?) from Jamaica, used for veneering, panels, cabinet-work and for furniture; Tabascan (*Excoecaria* sp.?) from San Domingo, shipped as Cocus wood; Cocus wood from Jamaica and Cuba (*Brya Ebenus*); Turkish stone or dogwood in spars, used for shuttles, &c. Squared logs of



Java teak (*Tectona grandis*) of various dimensions ; African Blackwood (*Dalbergia melanoxylon*), shipped as Granadillo, a name also applied by shippers to the Cocus woods above mentioned ; Bahama lignum vitae, manufactured and sold as boxwood in this country ; Partridge wood (*Andira* sp.), known also as ebony to shippers ; Hickory picking-sticks (*Carya* sp.) for weaving looms ; Bahia rosewood (*Dalbergia* sp. ?) in logs of 12 ft. by 1 ft. to 2 ft. ; lignum vitae (*Guaiacum officinale*). This timber has of late often taken the place of brass in engineering, and for stern tubes in shipbuilding. Messrs. Gardner usually have from 600 to 700 tons of lignum vitae in stock ; Hackia wood (*Izora ferrea*) from Demerara, used for fishing-rods, bows and arrows ; Majagua or Blue Mahoe (*Hibiscus elatus*) in the round from Cuba where it is used for furniture making. In this country it is valued on account of its elasticity for fishing rods. Some logs of Java rosewood and Madagascar redwood were also noted, also a considerable number of ash oars, including a consignment waiting indefinitely for shipment to Galatz.

OIL-SEEDS and OILS.—Several steamers from the West Coast of Africa were unloading considerable quantities of oil palm kernels and palm oil, and in this connection may be mentioned a hand winnowing machine in use in the dock sheds capable of cleansing from debris 120 bags of palm kernels per hour. Cotton seed in bags was noted from Callao, Peru ; Savanilla, Colombia, and from the West Coast of Africa. Beni seed (*Sesamum indicum*) in bags, shea nuts (*Butyrospermum Parkii*), and seeds of *Pentadesma butyracea* also in bags were observed from the West Coast of Africa, together with bags of undecorticated and decorticated ground nuts (*Arachis hypogaea*) ; copra, the dried kernel of the coco nut (*Cocos nucifera*), was observed from Cape Lopez, also a number of casks of wood oil from the Warri District of West Africa. The latter is probably derived from *Paradaniellia Oliveri* (see *Keo Bulletin*, Add. Ser. IX, part II., p. 270). Bags of linseed (*Linum usitatissimum*) were to be seen from Canada and from the River Plate, the latter weighing on an average about 137 lbs. Kapok seed (*Eriodendron anfractuosum*) in bags was noted from Java and so-called kapok seed from Guayaquil, the latter being probably derived from a species of the nearly allied genus *Bombax*. According to Diplomatic and Consular Report No. 4670, 12,000 tons of kapok seed were exported from Java in 1909 and 10,000 tons in 1910, Liverpool being the principal market for this seed. Some strongly bound casks of Chinese wood oil derived from the seeds of *Aleurites Fordii* were being overhauled in one of the dock sheds and strengthened preparatory to being transported to New York. In connection with the oil-crushing industry in Liverpool it may be mentioned that one firm alone crushes 2000 tons of oil seeds per week.

FRUITS, &c.—In the African sheds large quantities of bananas in crates were being unloaded from Elder-Dempster steamers. These were from the Canary Islands, which exported during the year 1911, 2,648,378 crates, Great Britain taking 1,461,866 crates.

From Canada and the United States of America thousands of barrels of apples could be observed, also barrels of grapes from Almeria and Valencia. Lemons in crates and pomegranates in cases from

Malaga, and quinces in cases from Lisbon. Of dried fruits a large import of currants in casks and boxes from Greece was being handled, each package being carefully scrutinized and repaired at the time where necessary. There were also considerable quantities of sultanas in boxes from Smyrna, and raisins in boxes from Valencia. Almonds in bags and boxes from Spain, and many bags weighing  $1\frac{1}{2}$  cwt. of nuts from Barcelona were also observed; also boxes containing preserved pine-apple from Singapore in 1 lb. chunks, and boxes of tomatos from Teneriffe.

**MISCELLANEOUS PRODUCTS**—In the West African sheds the following products were noted:—Rubber, known in the trade as "Thimbles," in plaited pillow-shaped packages from Maladi; gum copal from Sierra Leone and Sekondi; gum arabic in boxes of 1 cwt. 3 qrs., bearing the mark of the Royal Niger Company; barrels of bitter kola (*Garcinia Kola*); cases of true kola (*Cola acuminata*); bags of rubber from Forcados; Guinea grains, the seeds of *Amomum Melegueta*, in bags of about  $1\frac{1}{4}$  cwt.; capsicums in bags; bundles of a jute-like fibre from Burutu, probably derived from *Hibiscus lunariifolius*.

In the same sheds were considerable quantities of peeled osiers shipped from Madeira. These were in bundles of two sizes averaging 2 qrs. 15 lbs. and 1 qr. 25 lbs. respectively. The following account of this industry is gathered from Diplomatic and Consular Report No. 4069 on the Trade and Commerce of Madeira for the year 1907.—"Wickerwork.—This industry was introduced 40 or 50 years ago, and the peasantry being most adaptable to this kind of work, it increased year by year. I consider that more attention might be paid on the part of buyers to this excellent work. There are roughly speaking about 700 hands, men and women, employed, and the average amount paid in wages is stated to be from £8000 to £9000 per annum. Less than half of the willows cultivated in Madeira are used for the local industry, the rest being exported to Brazil, Cape of Good Hope and Canaries, and chiefly to the United Kingdom; but the made-up articles—chairs, &c.—are also sent to these countries and some to the United States of America. During 1907 about 400 tons of willows were exported to all countries. The value of one ton of willows is about £11, and the two kinds mostly grown are known as *Salix fragilis* and *Salix vitellina*." Other products noted were Piassaba (*Raphia vinifera*) from several West African ports. This on being landed was weighed into bundles of 5, averaging from 2 cwt. to 2 cwt. 2 qrs.; maize in bags from Lagos; cotton in bags weighing about  $\frac{3}{4}$  cwt. Other products noted elsewhere in the docks were: Manila hemp (*Musa textilis*) packed in matting and securely bound with rattan, weighing on an average about 268 lbs; loofahs (*Luffa aegyptiaca*) in neatly packed bales from Japan; jute (*Corchorus capsularis*) in bales from Calcutta, also large quantities of gunny bags made from this fibre for transshipment to Cienfuegos and Havana; esparto (*Stipa tenacissima*) from Spain; barley (*Hordeum vulgare*) from the Black Sea and Praha Prag; wheat (*Triticum sativum*) from United States of America, Australia, and River Plate; oats (*Avena sativa*) from the Argentine. These were being weighed into bags of 180 lbs.; maize (*Zea Mays*) from the Mediterranean; Patna rice in bags for

transshipment to Havana; unrefined beet sugar in bags from Hamburg; field beans (*Vicia Faba*) from Hankow; tapioca in bags from Singapore; molastella in bags from Java. This product I found upon enquiry to be tapioca root mixed with molasses and employed in the preparation of cattle food, as a good substitute for locust beans (*Ceratonia siliqua*) for the purpose; crushed tapioca root from Java. This had much the appearance of half-stuff for paper-making, being perfectly white. Like the last mentioned this is used for cattle food; rattans of various diameters bent in the middle and tied into bundles of many sizes; onions in crates from Valencia and Lisbon. Immense quantities of cotton were being landed from the United States of America, and one could not fail to observe the great waste of a valuable product due entirely to the flimsy covering of the bales and the absence of a strong binding material.

The following were observed on sale in the city:—Tonquin beans, the fragrant seeds of *Dipteryx odorata*, at seven for sixpence; sweet potatoes, the tubers of *Ipomoea Batatas* at sixpence per lb., and maté or Paraguay tea, the coarsely ground leaves of *Ilex paraguensis* at one shilling and sixpence per lb.

## X.—KRASCHENINNIKOWIA.

H. TAKEDA.

This small genus of *Caryophyllaceae*, established by Turczaninow\* and extended by Maximowicz,† though included in *Stellaria* by several botanists‡, is a distinct genus well characterised by the presence of a tuberous rhizome, dimorphic flowers, and 2-4 styles with capitate stigmas. The character of the petals, which are entire in the majority of the species and only emarginate in a very few, points to an affinity with *Arenaria*. Other characters, however, clearly separate it from the latter genus. The species referable to this genus are all small perennial shade-loving herbs occurring in India, China, Corea, Siberia and Japan.

Although *Krascheninnikowia* has been dealt with by Maximowicz|| and more recently by Korshinsky¶, a review based on good material seems to be desirable. §So far the following ten species of this genus have been published:—

*K. rupestris*, Turcz. in Flora 1834, Beibl. p. 9 (nom. nud.); Fl. Baic.-Dah. i, p. 239.

*K. heterophylla*, Miq., Prol. Fl. Japon, p. 351.

*K. raphanorrhiza* (Hemsl.), Korsh. in Bull. Acad. Imp. Sc. St. Pétersb., sér. 5, ix, 1898, p. 39.

\*Turcz. in Flora, 1834, Beibl., p. 9 (nom. nud.); Fl. Baic.-Dah. i. p. 238, in Endl. Gen. Pl., p. 968.

†Maxim., Prim. Fl. Amur., p. 57.

‡Benth. et Hook. f., Gen. Pl. i, p. 149; Baill., Hist. Pl. ix, p. 113; Hook. f., Fl. Brit. Ind. i, p. 231; Hemsl., Ind. Fl. Sin. i, p. 69; Franch., Pl. Delav. i, p. 100; Pax in Engl. u. Pr., Pflanzenfam. iii, 1, B., p. 80.

§Maxim., Fl. Tangut. i, p. 85.

||Maxim. in Bull. Acad. Imp. Sc. St. Pétersb. xviii, 1873, pp. 374-377.

¶Korsh., ibid. sér. 5, ix, 1898, pp. 37-40.



- K. Davidi*, Franch., Pl. David. i, p. 51, tab. 10.  
*K. sylvatica*, Maxim., Prim. Fl. Amur., p. 57.  
*K. heterantha* Maxim. in Bull. Acad. Imp. Sc. St. Pétersb. xviii, 1873, p. 376.  
*K. Maximowicziana*, Fr. et Sav., Enum. Pl. Japon. ii, p. 297.  
*K. himalaica*, Korsh., l.c., p. 40.  
*K. japonica*, Korsh., l.c.  
*K. eritrichioides*, Diels in Engl. Bot. Jahrb. xxxvi, Beibl. no. 82, p. 37.

As the result of my investigation, these should be reduced to six species, whilst a new one is to be added. The reasons for the reductions will be found under the species concerned.

The important distinguishing points, which have been used by many workers, are the nature of the leaf and petal, and the number of the styles. The last character appears to be subject to variation, as Maximowicz\* and Korshinsky† have noticed, and hardly any stress can be laid upon it, although it has been used by some botanists.‡ Markings on the seed seem to afford a good distinction between certain species, yet mature seeds are not always available in herbarium specimens. In my opinion the form of the petal and shape of the tuber are constant, and therefore reliable.

The leaves also show distinctive characters, yet one should be very careful as to the age of the leaf. When the plant is very young, the uppermost leaves of a heterophyllous species may differ very little from the smaller leaves situated in the lower part of the stem, yet they will in all probability grow much broader later on in the year, whilst the lower leaves have already attained their full size.

Herbarium specimens representing only this early stage would not, of course, show that and would in so far be deceptive. To give an example, *K. raphanorrhiza* (Hemsl.) Korsh. represents nothing but a young stage of *K. heterophylla* Miq. (1867), which was described from specimens showing the fullgrown stage of the species. This identification might appear questionable from the description given by Maximowicz, according to which *K. heterophylla* has 4-merous flowers, yet it would appear that this author has examined the cleistogamous flower only, the chasmogamous flower being normally 5-merous.

#### Enumeratio specierum.

1. *K. sylvatica*, Maxim., Prim. Fl. Amur., p. 57; in Bull. Acad. Imp. Sc. St. Pétersb. xviii, p. 376; in Acta Hort. Petrop. xi, p. 70; Korsh. in Bull. Acad. Imp. Sc. St. Pétersb. sér. 5, ix, p. 40.  
*Stellaria sylvatica*, Rgl., Pl. Radd. i, p. 421, tab. ix, figs. 12-16.  
 MANCHURIA: Amur, Bureja and Ussuri regions, Kirin. CHINA: Shingking, Kansu. JAPAN: Yesso; Kushiro, Tokachi. COREA.

A very distinct species in having linear leaves, tall slender erect stem, and small napiform tuber.

\*Fl. Tangut. i, p. 85; Pl. Chin. in Acta Hort. Petrop. xi, p. 70.

†Bull. Acad. Imp. Sc. St. Pétersb., sér. 5, ix, 1898, p. 39.

‡Maxim. 11. cc.; Fr. et Sav., Enum. Pl. Japon. ii, p. 297; Franch., Pl. Delav. i p. 101.

2. *K. heterophylla*, *Miq.*, Prol. Fl. Japon., p. 351; Maxim. in Bull. Acad. Imp. Sc. St. Pétersb. xviii, p. 377; Fr. et Sav. Enum. Pl. Japon. ii, p. 298.

*Stellaria heterophylla*, Hemsl., Ind. Fl. Sin. i, p. 68; Nakai, Fl. Koreana, i, p. 87.

*S. raphanorrhiza*, Hemsl., l.c., p. 69; Nakai, l.c.

*K. raphanorrhiza*, Korsh., l.c., p. 39.

*K. japonica*, Korsh., l.c., p. 40.

MANCHURIA: Ussuri region, Kirin. CHINA: Shingking, Kiangsi, Chekiang. JAPAN: Hondo; Nikkô, Nambu, vicinity of Tôkyô. COREAN PENINSULA and ARCHIPELAGO.

The identity of *K. heterophylla* and *K. raphanorrhiza* has already been mentioned. *K. japonica*, Korsh. is another synonym given to this species. At the first glance the type specimen of *K. japonica* appears to be distinct in the distant arrangement of the thinly pubescent leaves, because in *K. heterophylla* the uppermost two tiers of leaves are generally very much approximate, so that a whorl of four leaves is formed at the apex of the stem. This character, however, is not quite constant, and particularly in the specimens growing in very shady localities the leaves are distantly disposed. The peduncle of this species usually does not exceed the leaf.

This species produces abundantly cleistogamous flowers particularly when growing in shady spots. They may often extend up to the apex of the stem.

3. *K. Davidi*, *Franch.*, Pl. David. i, p. 51, tab. x, excl. var. *stellarioides*; Korsh., l.c., p. 39.

*K. Davidi* var. *flagellaris*, *Franch.*, l.c.

*Stellaria Davidi*, Hemsl., l.c., p. 67.

CHINA: Chihli.

Franchet included two different species under *K. Davidi*, his var. *stellarioides* being identical with *K. Maximowicziana* Fr. et Sav. The procumbent habit of this species is quite peculiar in this genus.

4. *K. rupestris*, *Turez.*, Fl. Baic.-Dah. i, p. 239; Fenzl, in Ledeb. Fl. Ross. i, p. 373; Rgl. Pl. Radd. i, p. 379, Maxim., l.c., p. 375; Korsh., l.c., p. 39.

SIBERIA: Dauria. MANCHURIA: Bureja region.

This species has erroneously been regarded by Edgeworth and Hook. f.\* to be the same as *Stellaria bulbosa*, Wulf. The Himalayan plant, however, belongs to *K. Maximowicziana* as already pointed out by Franchet† and Maximowicz. ‡

5. *K. Maximowicziana*, *Fr. et Sav.*, Enum. Pl. Japon. ii, p. 297; Maxim. Fl. Tangut. i, p. 85 and in Acta Hort. Petrop. xi, p. 70; Korsh., l.c., p. 40.

*K. Davidi* var. *stellarioides*, *Franch.*, Pl. David. i, p. 51, tab. x, fig. i.

*Stellaria Davidi* var. *himalaica* et *sessilifolia*, *Franch.*, Pl. Delav. i, p. 100.

*K. himalaica*, Korsh., l.c.

*Stellaria bulbosa*, Edgew. et Hook. f. in Hook. f. Fl. Brit. Ind. i, p. 231, nec Wulf.

\*Hook. f., Fl. Brit. Ind. i, p. 231

†Franch., Pl. Delav. i, p. 51.

‡Maxim., Fl. Tangut. i, p. 85.

*K. rupestris*, Maxim. in Bull. Acad. Imp. Sc. St. Pétersb. xviii, p. 376, quoad pl. Japon., fide ipsius.

*K. eritrichioides*, Diels in Engl. Bot. Jahrb. xxxvi, Beibl. no. 82, p. 37.

HIMALAYA: From the Indus to Bhotan. CHINA: Yunnan; Chihli, Shingking, Kansu. MANCHURIA: Ussuri region. JAPAN: Hondo; Fuji, Hakone.

Franchet described three varieties probably based on different stages or different morphological forms of one and the same species. He is also wrong in referring these to *K. Davidi*. Although I have not seen an authentic specimen of *K. eritrichioides*, I do not hesitate to reduce this plant to *K. Maximowicziana*, for all the essential characters given by the author for the former agree with those of the latter.

6. *K. heterantha*, Maxim. in Bull. Acad. Imp. Sc. St. Pétersb. xviii, p. 376; in Acta Hort. Petrop. xi, p. 71, in adnot.; Fr. et Sav., l.c., p. 297; Korsh., l.c., p. 40.

*Arenaria vulcanorum*, Maxim., in Fr. et Sav. l.c. i, p. 59, nom. nud.

*K. rupestris*, Maxim., in Fl. As. Or. Fragm., p. 6, non Turcz.

*Stellaria rupestris*, Hemsl., Ind. Fl. Sin. i, p. 69, nec *K. rupestris*, Turcz.

CHINA: Chihli. TIBET. JAPAN: Kyûshû. Hondo; Nikkô, Tsukuba, Chichibu.

Well characterised by its long pedicels and oblanceolate petals. Hemsley's combination, *Stellaria rupestris*, based on Maximowicz's erroneous record of *K. rupestris* in Fl. Asiae Orient. Fragment., must not be regarded as synonymous with *K. rupestris*, Turcz.

7. *K. Palibiniana*, Takeda, sp. nov., speciei praecedenti affinis, sed tuberis fasciculatis nec solitariis, angustissimis, pedunculis brevioribus sepalisque glabris distinguitur.

*Rhizoma* fasciculatum, fibrosum, fibrillis ad basim angustissime fusiformibus. *Caulis* solitarius vel subcaespitosus, simplex, erectus, glaber, lineis duabus pilis crispulis notatus. *Folia* heteromorpha, omnia fere glabra, inferiora oblanceolata, in petiolum anguste alatum ciliolatum attenuata, acutissima, media anguste oblanceolata, longe attenuata, suprema lanceolato-ovata vel ovata, basi subcuneata, acutissima. *Flores* chasmogami pauci, ad summum caulem orti, pedunculis glabris folia aequantibus vel iis usque sesquolongioribus; flores cleistogami axillares. *Sepala* subulata, ad 6 mm. longa, glabra, margine hyalina. *Petala* oblanceolata, acuta, quam sepala sesquolongiora. *Stamina* 10. *Styli* plerumque 3, stamina paulo superantes. *Semina* matura nobis ignota.—*K. raphanorrhiza*, Palib., Consp. Fl. Cor. i, p. 42, nec *Stellaria raphanorrhiza*, Hemsl., Ind. Fl. Sin. i, p. 69.

COREA: near Seoul, Sontag. JAPAN: Hondo; Nikkô, Bisset, Takeda.

Hemsley as well as Palibin referred specimens collected by Sontag to *Stellaria raphanorrhiza*; but whilst Hemsley's represent *K. heterophylla*, those of Palibin form the basis of the species here described. This is a remarkable species in having fasciculate rhizomes.



## Clavis specierum supra enumeratarum.

1. Petala obovata, emarginata ... .. 2  
    Petala integra ... .. 3
2. Folia omnia homomorphia, lineari-lanceolata. Planta  
    elata, gracilis, tuberibus brevibus napiformibus  
       1. *K. sylvatica*, Maxim.  
    Folia dimorphia, inferiora oblongo-lanceolata basin versus  
    attenuata, superiora lanceolato-ovata vel ovata. Caulis  
    pro genere crassus, tuberibus fusiformibus, crassis  
       2. *K. heterophylla*, Miq.
3. Petala obovata vel oblongo-obovato, truncata ... .. 4  
    Petala oblanceolata acuta ... .. 6
4. Folia omnia (exceptis nonnullis infimis) ovata, breviter  
    petiolata. Planta pedalis, caule diffuso ramoso procum-  
    bente apice tenuissime flagellari ... 3. *K. Davidi*, Franch.  
    Folia dimorphia, inferiora et media lanceolata vel oblongo-  
    lanceolata, basin versus attenuata, supra ovata. Planta  
    erecta ... .. 5
5. Folia lanceolato-linearia vel lanceolata, acuminata, breviter  
    petiolata. Petala oblongo-cuneata sepala parum  
    excedentia. Semina glochidiata ... 4. *K. rupestris*, Turcz.  
    Folia lanceolata vel ovato-lanceolata, longe petiolata.  
    Petala obovata, truncata quam sepala sesqui-longiora.  
    Semina acute tuberculata ... 5. *K. Maximowicziana*, Fr. et Sav.
6. Pedunculi folio subduplo longiores, tuberibus solitariis fusi-  
    formibus crassis ... .. 6. *K. heterantha*, Maxim.  
    Pedunculi foliis aequilongi vel sesquilongiores, tuberibus  
    fasciculatis angustissimis ... 7. *K. Palibiniana*, Takeda.

## XI.—MISCELLANEOUS NOTES.

MR. WILLIAM SMALL, M.A., B.Sc. of the University of St. Andrews, has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, Botanist in the Agricultural Department of Uganda.

MR. WALTER JOHN DOWSON, M.A. of the University of Cambridge, has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, Mycologist in the East Africa Protectorate.

MR. LOUIS FREDERIC RUSE, a member of the gardening staff of the Royal Botanic Gardens, has been appointed by the Secretary of State for India in Council, on the recommendation of Kew, a probationer gardener for service in India.

MR. C. K. BANCROFT, B.A., Mycologist in the Federated Malay States (*K.B.*, 1910, p. 253), has been appointed Assistant Director of the Department of Science and Agriculture and Government Botanist, British Guiana, in succession to Mr. F. A. Stockdale (*K.B.*, 1912, p. 392).

MR. STEPHEN TROYTE DUNN, B.A., F.L.S., late Superintendent, Botanical and Forestry Department, Hong Kong, has been appointed by the President of the Board of Agriculture and Fisheries, OFFICIAL GUIDE to the Royal Botanic Gardens, Kew, for one year from April 1st next.

The appointment of a Guide has been approved by Government as a temporary measure. Full particulars with regard to the tours will be made available at an early date.

Memorial to Sir J. D. Hooker.—A tablet to the memory of the late Sir Joseph Dalton Hooker was unveiled by Lady Hooker in Kew Church on Saturday, the 22nd of February. The ceremony was private and only members of the family and a few friends were present. The tablet, which has been placed on the wall of the north aisle near that of Sir W. J. Hooker, is a slab of polished marble with an inset oval medallion portrait of Sir Joseph and five surrounding panels. The portrait and panels are wedgwood, the ground work being a pale green. The portrait represents Sir Joseph at the age of eighty. The subjects of the panels are various plants typical of the wide range of his work and interests. The lower side panels contain: *Cinchona Calisaya* (introduction of *Cinchona* into India); *Rhododendron Thomsonii* (Himalayan Travels and Flora of British India) with *Celmisia vernicosa* (Flora Antarctica) between; in the two upper panels the plants are *Aristolochia Mannii* (African Floras) and *Nepenthes albo-marginata* (pitcher plants and Malayan flora). The following inscription has been engraved in the upper portion of the tablet:—

1817 – 1911.

J O S E P H   D A L T O N   H O O K E R,  
O. M.,   G. C. S. I.,   C. B.,   M. D.,   D. C. L.,   LL. D.

ASSOCIÉ ÉTRANGER OF THE INSTITUTE OF FRANCE,  
KNIGHT OF THE PRUSSIAN ORDER 'POUR LE MÉRITE',  
SOMETIME PRESIDENT OF THE ROYAL SOCIETY,  
FOR XX YEARS DIRECTOR OF THE  
ROYAL BOTANIC GARDENS, KEW.

BORN AT HALESWORTH, 30 JUNE, 1817.

DIED AT WINDLESHAM, 10 DECEMBER, 1911.

THE WORKS OF THE LORD ARE GREAT  
SOUGHT OUT OF ALL THEM THAT HAVE PLEASURE THEREIN.

Below have been placed the arms and motto of the family with, in addition, the motto of the Most Exalted Order of the Star of India.

The memorial tablet is the work of Mr. Frank Bowcher, the artist who prepared the medallion referred to in *K.B.* 1899, p. 53.

Botanical Magazine for February.—The plants figured are *Coelogyne cristata*, Lindl. (t. 8477); *Rhododendron sublancoelatum*, Miquel (t. 8478); *Cytisus nigricans*, Linn. (t. 8479); *Heliotropium anchusaefolium*, Poir. (t. 8480); and *Agave Haynaldii*, Tod. (t. 8481).

*Coelogyne cristata*, certainly one of the most beautiful orchids, a favourite because of its comparatively easy culture and from the fact that its handsome flowers are produced in the winter, was introduced into cultivation in 1837 and flowered for the first time in the collection of Mr. G. Barker of Springfield, Birmingham, four years later. It is now represented in gardens by at least three fine varieties. A native of the Temperate Himalaya, and most abundant from Central Nepal eastward to Bhutan, it is found as far west as Kumaon, and extends to the Jaintea and Khasia Hills in the east.

The *Rhododendron* is a native of the Loo-Choo Islands and is nearly allied to the well-known *R. indicum*, Sweet, being regarded by some authorities as a variety of that species. It may, however, be easily separated from *R. indicum* by the much larger ciliate calyx-lobes, and by the larger corolla. This is bright red, spotted with a darker colour on the upper lobes, and is over two inches long. The figure was prepared from material taken from a plant growing in the nursery of Mr. R. C. Notcutt, at Woodbridge.

*Cytisus nigricans* was one of the earliest species brought into cultivation in England, its introduction dating back to 1730. A native of Europe, it is very widely distributed, occurring in Switzerland, North Italy, and in practically all the countries of South-central Europe to South Russia.

The *Heliotropium* is a perennial herb, native of Eastern Brazil, Uruguay and the Argentine Republic, and while closely resembling in its flowers the familiar Sweet-scented Heliotrope (*H. peruvianum*, Linn.) it lacks the fragrance characteristic of the latter. It has been in cultivation for many years and flowers freely at Kew, where it is necessary to protect it during the winter. The illustration was prepared from material supplied from Miss Willmott's garden at Warley Place.

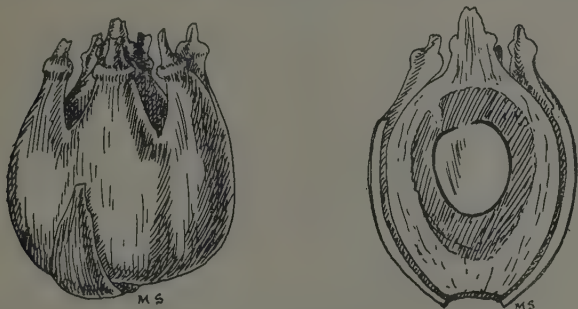
*Agave Haynaldii* is a member of the Marginatae group of Littaeas, distinguished by the horny border of the leaves and by the short perianth-tube with lobes which embrace the stamens as soon as the anthers are ripe. It is a Mexican or Central American species, and the plant from which the specimen figured was obtained is one that Dr. H. Ross, of the Palermo Botanic Garden, sent to the garden of the late Sir Thomas Hanbury at La Mortola in 1897. The inflorescence, produced in 1910, was 23 ft. long, borne on a peduncle  $4\frac{1}{2}$  ft. long.

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Oil Palm with Fleshy Perianth.—A specimen of a form of *Elaeis guineensis*, Jacq., has been received at Kew from Mr. W. H. Johnson, Director of Agriculture, Southern Nigeria, which had been found near Calabar, and is said to be called by the Eifik people "Ayara Mbana." The distinguishing character of this form is the presence around the fruit of a "collar," which consists of the persistent perianth having become more accrescent and more fleshy



than usual. Very little notice appears to have been taken previously of the perianth at the time when the fruit is mature, probably owing to it having been removed before the fruit is brought into the market. Chevalier (*Les Végétaux Utiles*, fasc. viii. p. 41) refers to it thus:—"A complete maturité, ils [the fruits] sont sessiles et renfermés comme dans une cupule dans le périanthe un peu accru mais scarieux et desséché depuis longtemps."



In Mr. Johnson's specimen the fruit is obovoid or subglobose, about 3 cm. long (not including the 1 cm.-long beak) and somewhat constricted at the base, not ventricose as in some varieties. The sclerenchymatous endocarp is about 3 mm. thick. The 6-partite perianth is accrescent, fleshy and almost encloses the fruit. Its segments have a transverse thickening about 5 mm. from their apices. According to an analysis made at the Imperial Institute it contains "69.9 per cent. of oil, equivalent to 14.8 per cent. calculated on the whole fruit, or 78.2 per cent. calculated on the dry pulpy covering." The ordinary pulp adhering to the nuts of this form yields 27.2 per cent. of oil. A specimen collected by Sir John Kirk at Zanzibar in 1869 shows the perianth enlarged in a similar manner,

C. H. W.

*Kerstingiella geocarpa*.—We are much indebted to Mr. P. H. Lamb, Director of Agriculture, Northern Nigeria, who has lost no time since his appointment in obtaining information about this new ground bean and in sending home material. A tin of seed pods reached Kew early in January of this year and with it Mr. Lamb sent the following particulars about the plant:—

"With reference to the article on 'A new Ground Bean' (*Kerstingiella geocarpa*), appearing in the *Kew Bulletin*, No. 5 of 1912 [pp. 209-213, with Plate], I have the honour to inform you that I have despatched to you by this week's mail a tin containing about 4 lbs. of the seed-pods of this interesting plant. These I got from a plot of one-tenth of an acre growing near Bida, the principal town of the Nupe Province. Besides this plot I have only seen one other place where a few plants were growing, and this was in a plot of *Voandzeia subterranea* also near Bida.

"Since my arrival in Nigeria I have toured around Kano, Zaria, Kabba and Ilorin, and have been always on the look out for

*Kerstingiella geocarpa*, but have only seen it on the two occasions mentioned above. It appears to be very rarely cultivated and not generally known. The cultivator of the plot of one-tenth of an acre informed me that he got the seed from the Kukuruku country in South Kabba two years ago.

"The Nupe name for it is 'Eyeya' or 'Ezokin,' which latter name simply means 'bean of the ground.'

"The Kukuruku name is 'Etami.'

"The Hausa name for *Voandzeia subterranea*, a very general crop in Northern Nigeria, is 'Kawaruru' pronounced by many of the Nupe people 'Paruru.'

"Hausas to whom I showed the growing crop of *Kerstingiella geocarpa* called it, without hesitation, 'Kawaruru,' doubtless owing to its general similarity to that crop, but on showing them the harvested pods they admitted that the crop was quite strange to them and that they had no name for it.

"It would indeed be extraordinary if two such totally different seeds were called 'Kawaruru.'

"The measurement of the seeds given on page 210 [*K. B.*, 1912], where 'cm.' has evidently been written in error for 'mm.,' appears to be considerably in excess of that of the present sample.

"Though most of the pods carry either one or two seeds, some were noticed containing three.

"The crop yielded at the rate of 600 lbs. of dry pods per acre.

"The beans are boiled and eaten in the usual way, no superstition here existing as to their unsuitability for women

"The cultivation is exactly the same as for *Voandzeia subterranea*, sowing took place this year in July and harvesting about 3½ months later in October. The temperatures averaged approximately max. 85° F. and min. 70° F. during this time, and the air was exceedingly moist.

"I have been unable to observe it in the wild state. It is hoped to continue the cultivation of this plant as an experimental plot next season.

"I am also sending by this mail two small samples of the seed of *Voandzeia subterranea* both purchased in Bida. They appeared to me to be interesting as illustrating the great variety both in size and colour which may occur in this species."

The seeds of *Kerstingiella geocarpa* and *Voandzeia subterranea* have been sent to Natal Botanic Garden, Jamaica, Trinidad, Bangalore, Calcutta, British Guiana, Queensland, and Adelaide Botanic Garden.

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The Destruction of *Albizia Lebbek* in Cairo.—Mr. G. St. C. Feilden, Chief Gardener to the City of Cairo, has, at our request, kindly sent the following note on the mealy bug which has caused such havoc among the *Lebbek* Trees in the streets of Cairo.

Until the summer of the year 1909 Cairo contained some thousands of fine specimens of *Albizia Lebbek*, which formed shady avenues

throughout the town. In the space of four years three-quarters of these trees have disappeared, their destruction having been brought about by the ravages of a species of mealy bug, *Dactylopius perniciosus*. Such are the depredations of this pest that in four months it will entirely destroy the largest tree. Although it is only of recent years that this mealy bug has made its presence felt it has doubtless existed in Egypt unnoticed for a number of years.

The insects can be found on almost every Lebbek in the neighbourhood of Cairo but it is only in the town itself that it has caused serious damage. Here the trees planted in paved and tarred streets, deprived of air at the roots except that provided by a small grating, and shut in by high houses on each side, were growing under unnatural conditions and were in consequence in indifferent health. On the Gesirah side of the Nile, where the paths are not paved or the roads tarred, and where the trees are exposed to every wind, the mealy bug, though everywhere present, makes no headway. It would seem therefore that the increase of the insect is influenced by the state of health of the host. The attack begins in May, is at its height in June and July, and commences to slacken in August. The species appears to be very prolific. Mr. F. C. Willcocks, entomologist to the Khedivial Society of Agriculture, found 1100 eggs in the ovisac of a female.

The young larvae settle on the twigs and in the axils of the leaves and the trees then appear to be covered with lumps of dirty white wool. Presently the whole crown of the tree shrivels, presenting a scorched and blackened appearance. The leaves then fall, but many are caught and retained by the sticky secretion of honey dew given off by the insects, and by their slightly adhesive ovisacs. Little bundles of fallen leaves and stamens thus accumulate all over the tree, giving it a bunched appearance. These collections of leaves form a very efficient protection to the insect and render the application of spraying emulsions almost useless. In August the tree is completely defoliated and in a few months it dies. As above mentioned, spraying unless carried out at an early stage, is of little avail, and furthermore the height of the trees renders the operations very difficult of thorough performance. A drastic remedy tried was that of cutting back the trees attacked almost to the main trunk and cleansing with a strong petroleum emulsion applied with a stiff brush.

The trees so treated, however, nearly always died, or if they survived were permanently spoilt in appearance. There can be no doubt that the Lebbek is doomed as an avenue tree in Cairo, except under the most favourable conditions. The problem that remains is to find the most suitable trees to take its place. The danger of relying on one species only has been sufficiently demonstrated.

An interesting account of the mealy bug, illustrated by some excellent photographs, both of the pest and the infected trees in Cairo, was published by Mr. F. C. Willcocks in the Bulletin of Entomological Research, Vol. I. pp. 121-141 (1910-11).



**The Reproduction of *Musanga Smithii*.**—One of the most striking features of tree life on the West Coast of Africa is the rapidity with which abandoned clearings are covered by the Umbrella tree or Corkwood (*Musanga Smithii*, P. Beauv.). This is commented on by all travellers, and it is brought to one's notice more especially by the long stretches of hillside covered with this tree which are to be found along the railway, round mining centres, and in fact wherever any land, which has been stripped of its original forest covering, is left to itself for a few months.

The general appearance of these pure stands of Umbrella tree is that of a young open wood, the trees being all of an even height of about 30 feet. Although there may be many acres of such forest, one never sees amongst them any flowers or signs of flowering trees. For these it is necessary to go into the original uncut "bush," and there occasionally an old tree may be found, much larger than those in the open, generally solitary or with a very few of its own kind, and, if it is flowering, in the majority of cases it is found to bear male flowers only.

This fact suggested that a closer examination of the pure stretches of forest composed of this tree should be made, with a view to ascertain the method by which its area is so effectively and so rapidly extended. The stands examined were those at Amokokrom, and Boundary Post in the Western Province of the Gold Coast Colony.

It was then noticed that the trees towards the outside and exposed parts of the forest put forth adventitious roots from all parts of the stem up to a height of about 10 feet from the ground. Sometimes these roots came away from the stem at a right angle and, after growing out horizontally for about a foot, inclined slightly downwards until they reached the soil. On reaching the soil a shoot was sent up from the end of the root and a new tree was thus formed at some little distance from its parent. In other cases the adventitious roots inclined downwards at once from their point of origin, in this case striking the soil in the immediate vicinity of the parent tree.

Often the roots were noticed to have been broken in mid air, when in some cases they simply forked, the two rootlets continuing downwards to the soil and forming two new trees; or in other cases a shoot was sent up and a root down from the point of injury, thus starting a new tree in mid air. There seems little doubt, therefore, that these pure stands are extended effectually by vegetative reproduction, at least within the zone of the moist Evergreen Forest, and in consequence the formation of flowers and fruit has fallen into disuetude.

T. F. CHIPP.

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**Insecticides, Fungicides and Weedkillers.\***—This book is an attempt to summarise what is known up to the present of the chemistry,

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\* Insecticides, Fungicides and Weedkillers.—A practical manual on the diseases of plants and their remedies, for the use of Manufacturing Chemists, Agriculturists, Arboriculturists, and Horticulturists. Translated from the French of E. Bourcart, D.Sc. 450 pp. 83 tables and 12 illustrations. Scott, Greenwood & Son. 1913. 12s. 6d. net.

uses and mode of action of the various preparations used in agricultural practice, and contains much useful information which is not given in text-books written from a botanical standpoint.

The detailed descriptions are prefaced by a chapter on general principles, in which the importance of attention to general hygiene and avoidance of conditions predisposing plants to disease is insisted upon.

At the end of the book there is a useful glossary in which short accounts of the various destructive insects and fungi are given. There is also a well-compiled index but unfortunately references to literature are omitted.

**Forestry in South Africa.**—The Report of the Chief Conservator of Forests, Union of South Africa, for the year ending December 31st, 1911, contains an interesting account of the work of the Department during the year, together with a detailed statement of revenue and expenditure for the same period.

The work of the Department is apparently divided into two branches, the object of the principal branch being to renovate old forests and to create new ones for the supply of timber and other forest products for general use, whilst the energies of the other division are concentrated upon raising timber mainly for the purpose of supplying sleepers for State railways.

The various statistical tables point to steady progress, and in the case of the older plantations to an increasing revenue with a decreasing net working cost. But the allusions to losses caused by insect and fungus pests, fires and theft, indicate that the trials incidental to the formation of new plantations and the renovation of old forests are as prevalent in S. Africa as they are elsewhere, and that it is always wise when estimating for proposed work to allow a generous margin for such contingencies.

It is interesting to observe that in almost all cases greater faith is placed upon exotic than upon native trees for planting, and that where groups of indigenous trees occur they are usually self-sown seedlings. Even for underplanting forests of native trees, exotics are used.

The chief native trees are *Podocarpus* spp., *Ocotea bullata*, *Curtisia faginea*, *Olea laurifolia*, *Apodytes dimidiata*, *Ptaeroxylon utile*, *Gonioma Kamassi*, and *Callitris arborea*, whilst various species of *Eucalyptus* and Australian *Acacia* divide with *Pinus insignis*, *P. Pinaster*, *P. canariensis* and *Cedrela Toona* the honour of being the principal exotic trees grown. Several of the latter species with *Pinus sylvestris* are reproducing themselves in or about the forests.

The highest price obtained for the wood of a native tree was 1s. 1d. a cubic foot, for the wood of *Ocotea bullata*; the highest priced exotic being *Eucalyptus* at 10½d. a cubic foot. Thinnings from plantations of *Pinus Pinaster* and *P. insignis* realised 6d. and 5d. a cubic foot respectively. To illustrate the difference in price obtained for the wood in the forest and the same wood in Cape Town worked up ready for use, 2½d. a cubic foot was obtained for yellow

woods (*Podocarpus* spp.), in the forest, whereas the manufacture value in town was never less than 5s. a cubic foot.

An idea of the annual increment which is taking place in various plantations may be gathered from the accompanying table:—

| Locality.                   | Species.                                           | Age: Years. | Espacement.  | Mean Height. | Mean Girth. | Cubic ft. per Acre. | Mean Annual increment per Acre. | Remarks.                                                                 |
|-----------------------------|----------------------------------------------------|-------------|--------------|--------------|-------------|---------------------|---------------------------------|--------------------------------------------------------------------------|
| Bazeya<br>(Mountain)        | <i>Eucalyptus saligna.</i>                         | 6           | 5×5          | 50           | 11½         | 2,660               | 443                             |                                                                          |
| Do. ... ..                  | <i>Acacia decurrens</i><br>var. <i>mollissima.</i> | 11          | 6×5          | 43           | 10½         | 2,836               | 258                             | Excluding thinnings, first of which was made at 6 years of age.          |
| Libode (Coast)              | <i>Eucalyptus saligna.</i>                         | 11          | 5×5          | 78           | 24          | 6,496               | 590                             |                                                                          |
| Amanzamnyama<br>(Mountain). | ● <i>Pinus Pinaster.</i>                           | 14          | 4×4          | 40           | 11          | 5,258               | 375                             |                                                                          |
| Do. ... ..                  | <i>Pinus insignis.</i>                             | 17          | 3×6          | 71           | 25½         | 5,537               | 326                             | Thinned to 8 ft. × 8 ft. at 11 years. No record quantity thinnings kept. |
| Cencane<br>(Mountain).      | <i>Acacia decurrens</i><br>var. <i>mollissima.</i> | 6           | 3 ft. drills | 27           | 4½          | 2,760               | 460                             |                                                                          |

During the year 111,205,265 pounds of Wattle (*Acacia*) bark, valued at £289,557, were exported for tanning, Germany taking about two-thirds and England the remainder. It is, however, considered that a better trade with England might be established by exporting extract rather than the bark itself.

Another rather important article of export during the year was Buchu (*Barosma* spp.) leaves. About 212,082 pounds, valued at £29,647 were exported. This is considered to be such an important article that the collection of leaves is placed under the supervision of the forest officers.

The Report concludes with 14 interesting illustrations of forest scenery and forest work.

W. D.







CATASETUM DARWINIANUM.